The AutoMOD Project
A Web Portal for Automated Model Diagnosis

Documentation

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About this document

This is the documentation the AutoMOD project, version 1.0.
Its intent is to cover most aspect of AutoMOD, installation, configuration, usage and customization.

Acknowledgements: *The AutoMOD project has been realized at the Institut Pierre Simon Laplace (IPSL), France.*

Contents

Chapter 1

Introduction

1.1 Concepts

AutoMOD's goal is to allow its *users* to intercompare results from different *models* (e.g. NCAR, ECMWF, etc…). Each one of these can have multiple *version* (different physics, different grid type, etc…
Each version of these models is run against a *scenario*, these scenarii can be grouped by *types*, each of these can have multiple *subtypes*.Multiple realization can be submitted for each scenario
Through a web interface the user fisrt choose the scenario (experiment) he's interested in. In a second step he can choose among the variables available for this scenario. The user then selects the model he is interested in. Finally the user select one or more diagnosis he would like to be performed with the selected parameters. The analyses are then run in the background and the user receives an email with an URL pointing to the Atlas generated (PDF or Tex format).
In a near future the users will have the option to further customize the diagnosis and even eventually to access interactive "on the fly" diagnoses.
The same web interface can also be used to upload model output and access documentation about users, models, their various versions and runs.

1.2 What is AutoMOD designed for?

AutoMOD is designed to help scientists spend less time on technical issues, share ressources and focus on Science.

1.2.1 Lifting off the weight from technical issues

By adhering to some strict, but not arbitrary, standards while pre-processing their data, scientists will be able to easily and quickly share and analysis their results. They will simply have to put them on an ftp site and documenting them via the web interface.

1.2.2 Sharing Ressources

The hope of AutoMOD is not only to have the model output shared among scientists but also to increase the sharing of diagnosis. Indeed, with very few effort, scientists will be able to develop “plug-and-play” tools to enhance the AutoMOD portal capabilities.

1.2.3 Focussing on Science

Once the weight of data pre-processing and diagnoses developping has been removed from scientists shoulders, and once they have been offered easy access to more data from various sources, scientists will be able to focus on understanding the scientific issues they care for and will spend less time “getting their hand dirty” reformatting the data or (re)implemeting already existing diagnosis.

1.3 What is AutoMOD NOT designed for?

AutoMOD is not designed for random data exploration, it is not a full cvontrol on the data system (for this there is excellent packages such as the Climate Data Analysis Tools (CDAT) developped at PCMDI.

1.4 Future

At the moment envisionned improvements to AutoMOD are:

- AutoMOD near futur is more interactivity with the user, more control on the “look and feel” of the diagnosis
- Multi-Variable Analyses.
- “Admistrator” interface.
- Cross scenario Analyses.

Chapter 2

Installing and Configuring AutoMOD

Provided a few pre-requisites and a minimum *ONCE-only* configuration, setting up AutoMOD is easy. In this chapter we will describe how to install AutoMOD and its external software.

2.1 Prerequisites - External Software

AutoMOD is based on a few externals that you will need to install on you system:

- The Climate Data Anaylsis Tools (CDAT).
- An Apache Server with the mod_py module enabled.
- A MySQL server.

As part of the AutoMOD installation process, the following section explains how to obtain theses packages and provide a few pointers on how to set them up. Please refer to each system's specific documentation for up-to-date documentation.

2.2 Installing AutoMOD

2.2.1 AutoMOD

Obtaining the software

AutoMOD can be obtained at: http://lsce.saclay.cea.fr

Installing

Although in theory each package could be installed in any order we recommend to follow the order describe by this manual in order to obtain the smoothest possible installation process.
In the minimalist approach you can simply untar the AutoMOD anywhere. In practice we recommend to untar it after installing Apache in the [APACHE_DIR]/htdocs directory.
Which ever choice you decide on, we will refer to this directory as: [AutoMOD_DIR]

2.2.2 Climate Data Analysis Tools (CDAT)

Obtaining the software

CDAT can be downloaded from its website: http://cdat.sf.net
We used version 4.1.2 of CDAT. Any version above 4.0 should work.
This version is based on Python 2.4.3. Any Python version above 2.0 should work.

Installing (in respect to AutoMOD)

There are many ways to install CDAT, whichever way you decide does not matter for AutoMOD, just remember where you installed it. From this point on, the CDATinstallation directory will be refered in this document as [CDAT_DIR]

2.2.3 Apache Server

Obtaining the software

At the time this document is written the mod_python extension for Apache will not work with the latest version of Apache (2.2), therefore you will need to install version 2.0.58 of Apache.
Apache can be obtained at: http://www.apache.org

Installing (in respect to AutoMOD)

AutoMOD does not require any particular installation “tweaks” for the Apache server
From this point on, the Apache installation directory will be refered as: [APACHE_DIR]

2.2.4 mod_python extension for Apache

Obtaining the software

the mod_python extension can be obtained at: http://www.modpython.org
We used version 3.2.8 of mod_python

Installing (in respect to AutoMOD)

In order to install mod_python with the correct Apache server and the correct python (in our case CDAT) you will need to run the following configure command:
./configure –with-apxs=[APACHE_DIR]/bin/apxs –with-python=[CDAT_DIR]/bin/python
Add any option specific to your environement.

2.2.5 MySQL

Obtaining the software

We used version 5.0 of MySQL but we believe that any version of MySQL should work. In fact it should be fairly easy for an advanced user to setup AutoMOD to work with ANY database provided it as a fairly standard SQL.
MySQL can be obtained at: http://www.mysql.com
Additionally you will need the Python extension for MySQL which can be found at:
http://sourceforge.net/projects/mysql-python

Installing MySQL (in respect to AutoMOD)

AutoMOD does not require any particular installation "tweaks" for the MySQL server, except that it is safer to add the option *–enable-thread-safe-client* in order to be sure that the python package builds.
From this point on, the MySQL installation directory will be refered as: [MYSQL_DIR]

Installing the Python extension

untar and run:
$[CDAT\_DIR]$/bin/python setup.py install

2.3 Configuring AutoMOD and its external components

2.3.1 Configuring Apache for AutoMOD

You will need to edit the *http.conf* file of your installation to point to the directory of your AutoMOD. This file can usually be found under:
[APACHE_DIR]/conf/http.conf
Alias /AutoMOD [AutoMOD_DIR]
The default templates for AutoMOD use "Server Side Includes" (SSI) technology, you'll need to enable it:
AddType text/html .shtml
AddOutputFilter INCLUDES .shtml Finaly make sure to set the Server name correctly, for example *ServerName dogmatix.saclay.cea.fr:1556*

2.3.2 Configuring mod_python

Here again you will need to edit your *http.conf* file:
LoadModule python_module [APACHE_DIR]/modules/mod_python.so
And define the AutoMOD Python Handlers:

```
<Directory [AUTOMOD_DIR]/Python>
SetHandler mod_python
PythonHandlerModule login
## Uncomment the following for debug output
## PythonDebug On
<Files ”login”>
PythonHandler login
</Files>
<Files ”users”>
PythonHandler users
</Files>
<Files ”institutes”>
PythonHandler institutes
</Files>
<Files ”groups”>
PythonHandler groups
</Files>
<Files ”models”>
PythonHandler models
</Files>
<Files ”simulations”>
PythonHandler simulations
</Files>
<Files ”diags”>
PythonHandler diags
</Files>
</Directory>
```

2.3.3 Configuring MySQL for AutoMOD

The AutoMOD distribution comes with script that will create a database for AutoMOD with all the needed tables.
This script can be found in the Install subdirectory:
$[AutoMOD\_DIR]$/Install/create_db.py
It also picks information from:
[AutoMOD_DIR]/Python/SQL.py

Setting up the MySQL Server

Edit the header section of the *SQL.py* file to reflect your environement:

- ***host:*** ('asterix1'): represents the hostname of the *MySQL* server.
- ***dbname:*** ('AutoMOD'): represents the name of database that will be created in your MySQL install. If any database already exist with this name *IT WILL BE DELETED*, therefore make sure to put a unique name here, or at least backup the old database.
- ***user:*** ('cdoutrix'): represents the *MySQL* user that will be used to access the database that we just created. This user should already be existing.
  Tip: Remember the mysql user you created for AutoMOD and grant it read/write privileges on AutoMOD tables. Make sure to run "mysqladmin flush-privileges" to have these reflected right away.

Filling some default in the tables

Edit the *create_db.py* file to reflect your environement.
In the file look the following tables declaration:

- types
- subtypes
- institutes

You should edit these to reflect your project.
Note that while ***institutes*** can be edited from the web interface, ***types*** and ***subtypes*** can only be edited from the MySQL interface, i.e. the administrator.
The ***types*** and ***subtypes*** tables are specific to your project.
In the default setup, there are 5 ***types*** (CFC, Abiotic, Biotic, Injection and Helium).
The "Abiotic" type for example carries the id ***2***, you'll note then that for each subtype of "Abiotic" the *type* field in the subtype table definition is set to ***2*** accordingly (e.g. ctrlF).
Please take **GREAT** care of the *"doc"* field, as it will be used on the Atlases to describe the type of scenario chosen. Note: The "**@**" signs mark the separation between the mysql fields.

Defining some default user(s)

Finally at the very end, the script adds a default user, edit this to reflect yourself, and promptly change your password once AutoMOD is up and running!!!
An admistratror user (admin) is also created, edit its password here. It is also re-comended to change it from the mysql interface.

Executing the script

Once all is edited run the script as follow:
[CDAT_DIR]/bin/python [AutoMOD_DIR]/Install/create_db.py
You are then prompted for the adminstrator password of the MySQL server. Enter it and you're done.

And more…

See the MySQL Tables (Annex B, page 45) to learn about the table defined and their relationships

2.3.4 Configuring AutoMOD

Concepts

As we explained earlier (see section 1.1 page 1) AutoMOD's goal is allow its *users* to intercompare results from different *models* (e.g. NCAR, ECMWF, etc…). Each one of these can have multiple *version* (different physics, different grid type, etc…
Each version of these models is run against a *scenario*, these scenarii are divided by *types* and each type can have multiple *subtypes*. The default AutoMOD *scenario* structure is as follow:

- CFC
- Abiotic
  - CIS92A
  - ctrlF
  - ctrlH
  - ctrlP
  - equil
  - hist
  - pulse
  - S650
- Biotic
- Injection
  - C1500
  - C3000
  - C800
  - E1500
- Helium

Note: For each scenario type you can upload multiple *simulations*(or realizations), therefore allowing for ensembles.

MySQL Tables

The AutoMOD distribution comes with script that will create a database for AutoMOD with all the needed tables.
This script can be found in the **Install** subdirectory:
$[AUTOMOD\_DIR]$/Install/create_db.py (see section 2.3.3 page **??**).

The file [AutoMOD_DIR]/Python/SQL.py contains the informations to connect to the MySQL server.

Data hosting

The file [AutoMOD_DIR]/Python/DB.py contains the informations about data storage. All you need to do is edit is the value of the ***root*** variable, it should point to the directory on your server file system where you wish to store the data.
Note: In the future if ESG or OpenDAP serving is added this section is likely to change.

Web-interface aspect

Most aspects of the "look and feel" of AutoMOD are easily controled. The files controlling these are located in $[AutoMOD\_DIR]$

First of all, the file ***styles.css*** contains informations for the Cascading Styles Sheets (CSS). We defined different type of classes:

- ***info***: Controls the aspect of elements displayed considered as informative.
- ***help***: Controls the aspect of elements displayed considered as help.
- ***result***: Controls the aspect of elements displayed considered as result from an action taken by the user.
- ***error***: Controls the aspect of elements displayed considered as resulting from a user error.
- ***form, input, select***: Controls the aspect of the forms and their elements.
- ***diags***: Controls the aspect of elements displayed in the diagnosis pop-ups.

Actions processed by the AutoMOD python handler will always be *sandwiched* between the content of ***main.shtmnl*** and ***bottom.html***.
These two files can contain anything you want. In general they contain the header, the user menu and the footer.
Any mod_python restriction would of course apply here. For example the *.shtml* include tag: <!–#include file= is not understood, but in AutoMOD a plug has been added for it and the directive is now understood.

Chapter 3

Using AutoMOD

3.1 Generalities

It is important to understand the philosophy behind AutoMOD. The idea is to make public some data and diagnosis, allowing a greater number of scientists to work with the data. AutoMOD's goal is to make this as automated as possible. Obviously automation requires the developers to make a few choices and to limit what can be done with the data. At the time being, for example, diagnoses can not yet be "tuned" be the user, but this feature should appear soon. But even then, the number of "tuning" avalailable to the user will be limited. First of all, because development time isn't unlimited, and second of all beacuse it is necessary to make sure the server does not get swamped by the users requests.

Also, being "automated" does not mean that that we can bypass human action all together. There are still parts where the user intervention is necessary. This concerns mainly documentation. In fact the better the project will be documented the more useful it will be. Documentation can not be "guessed" by the computer. Although AutoMOD tries to be as "smart" as possible about it, at some point the information needs to be entered by a human.

Finally AutoMOD's goal being to facilitate cooperation between scientists, we understand/hope that the notion of groups will become quickly necessary. We also understand than once some groups have been formed, the case arises where some data may need to be posted onto the system but made available immediately to the public, only a "group" of scientists. Accounting for this, AutoMOD is based on "login", i.e. users must identify themselves before using it. Users posting data "own" them and control read/write access to the data and their metadata, they can share authority on these with other users or group of user.
The rest of this section will describe the basics of using AutoMOD, ther following section will describe in more details uploading data and documenting AutoMOD.

3.2 Basics

3.2.1 Loging in AutoMOD

We explained it, you need to be identified before using AutoMOD. Therefore the first step will be to create a user account for yourself.

Creating an AutoMOD account

In the menu on the left click on **Users** to access the users section (Figure 3.1), click on the ***Create new user*** button (Figure 3.2). Fill in the informations. If your institute does not appear in the dropdown list, select any one in the list, you'll be able to create your own institute once you're logged in.

Loging in

If you already have an account created, simply click on **Login** in the left hand menu. Enter your login and password, click on the ***Login*** button and you're in. See Figure 3.3.

Retrieving your login informations

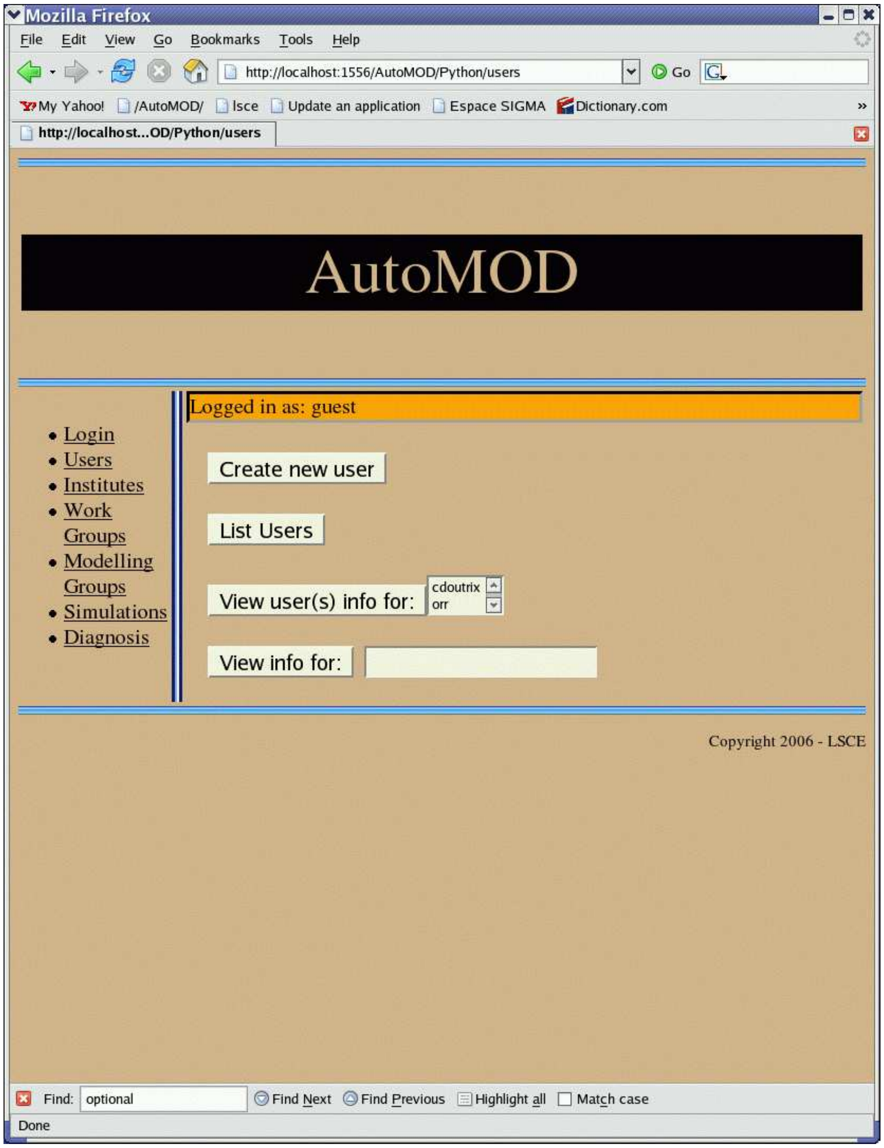
If you already have an account created but forgot what it is or what your password is, simply click on **Login** in the left hand menu (Figure 3.3). Click on the ***click to retrieve user infos*** button (Figure 3.4). On the subsequent page you can then retrieve your informations. If you forgot you *login* simply enter in the top box the email address you provided when first registering and click on ***Email me my login*** (Figure 3.4).
If you remember your login but cannot remember your password, enter your login and the email you provided when registering in the bottom two boxes, click on the ***Email me a new password*** button (Figure 3.4) and a new passwword will be generated and emailed to you.

Loging out of AutoMOD

In order to log out of the system, click on **Login** in the left hand menu. Click on the ***Logout*** button (Figure 3.3). Note that you will be automatically logged out if after 30 minutes of inactivity.

Creating a new Institute

In case your institute wasn't in the list when you registered, click on **Insitutes** in the left hand menu (Figure 3.5), click on ***Create new institute***, fill in the informations and click ***Create*** (Figure 3.6.



http://localhost:1556/AutoMOD/Python/users

Logged in as: guest

View user(s) info for: cdoutrix orr

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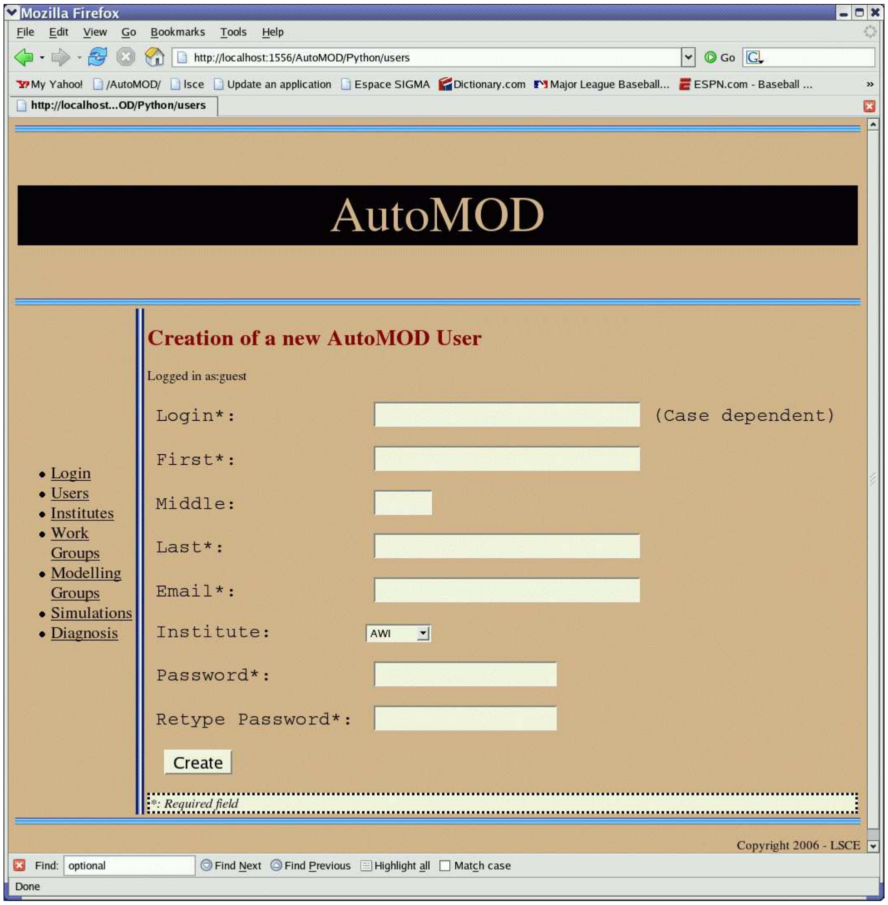
Find: optional

Figure 3.1: The Users Section.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Python/users
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com Major League Baseball... ESPN.com - Baseball ...
http://localhost...OD/Python/users
AutoMOD
Login
Users
Institutes
Work Groups
Modelling Groups
Simulations
Diagnosis
Create
Copyright 2006 - LSCE
Find: optional
Find Next
Find Previous
Highlight all
Match case
Done

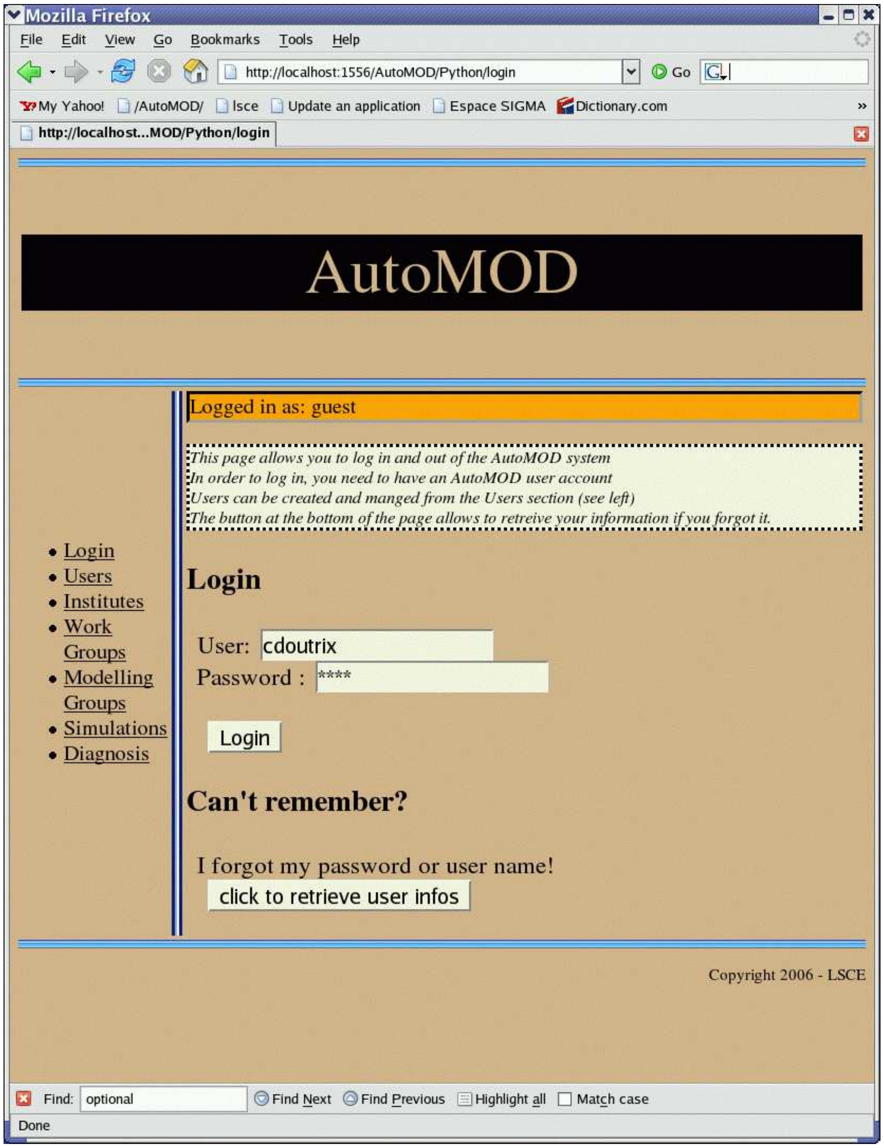
Creation of a new AutoMOD User

Logged in as:guest

Login*:		(Case dependent)
First*:		
Middle:		
Last*:		
Email*:		
Institute:	AWI	
Password*:		
Retype Password*:		

*: Required field

Figure 3.2: Creating a new user.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Python/login
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com
http://localhost...MOD/Python/login
AutoMOD
Login
Users
Institutes
Work Groups
Modelling Groups
Simulations
Diagnosis
Login
click to retrieve user infos
Find: optional
Find Next
Find Previous
Highlight all
Match case
Done

Logged in as: guest

This page allows you to log in and out of the AutoMOD system
In order to log in, you need to have an AutoMOD user account
Users can be created and manged from the Users section (see left)
The button at the bottom of the page allows to retreive your information if you forgot it.

Login

User: cdoutrix
Password : ****

Can't remember?

I forgot my password or user name!

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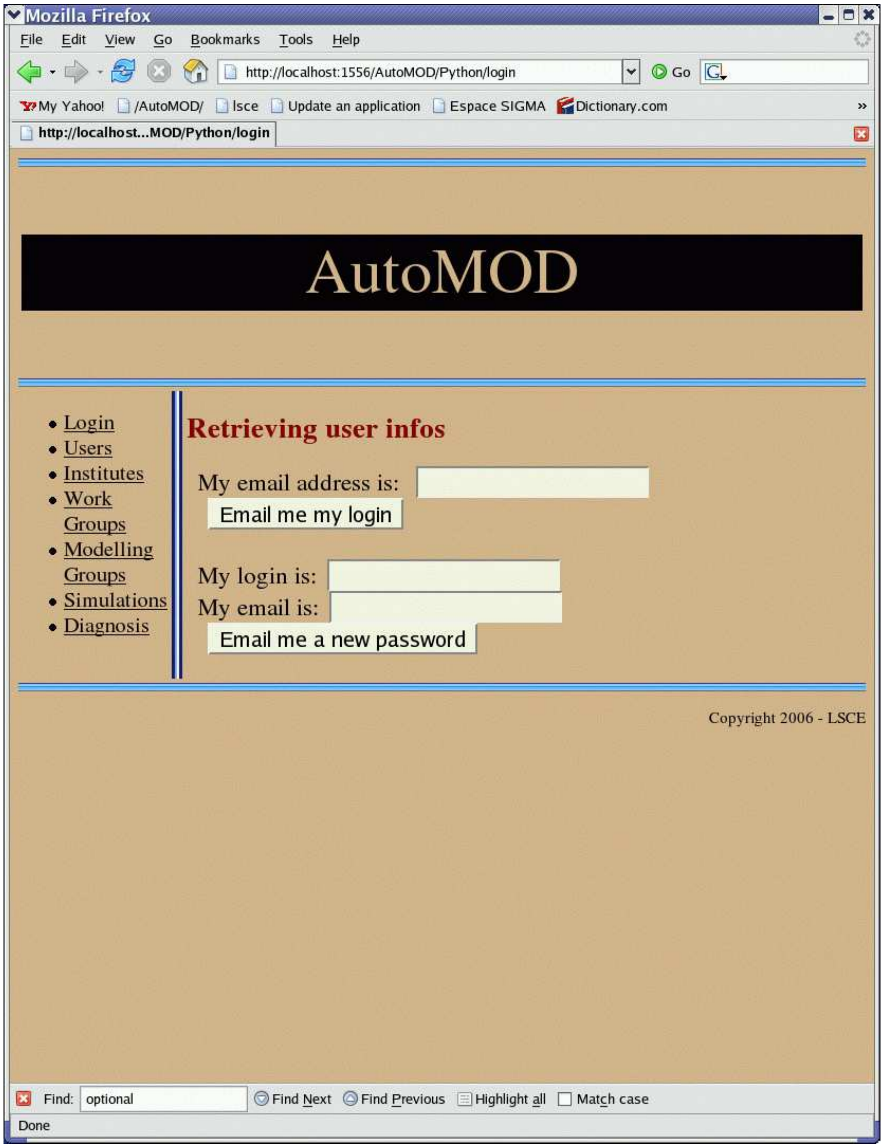
Figure 3.3: Loging in.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Python/login
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com
http://localhost...MOD/Python/login
Login
Users
Institutes
Work Groups
Modelling Groups
Simulations
Diagnosis
Email me my login
Email me a new password
Find: optional
Find Next
Find Previous
Highlight all
Match case
Done

AutoMOD

Retrieving user infos

My email address is:

My login is:

My email is:

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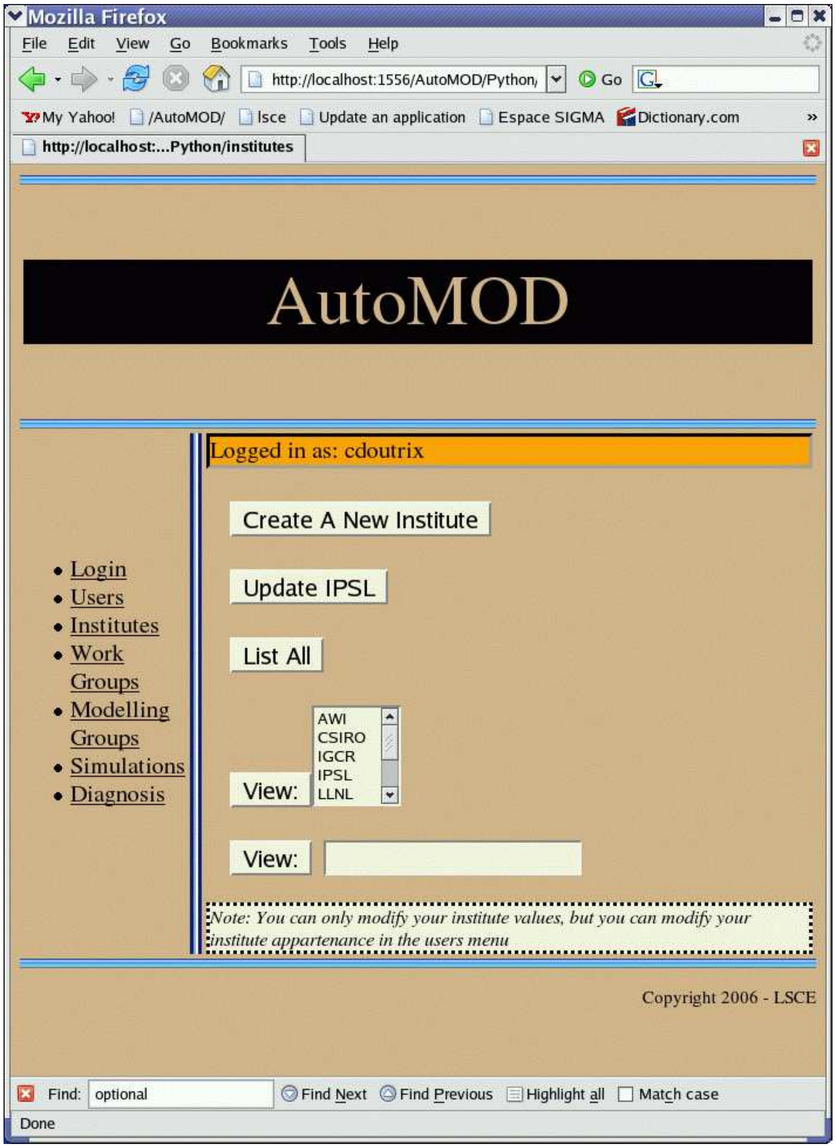
Figure 3.4: Retrieving your login information.



Logged in as: cdoutrix

Note: You can only modify your institute values, but you can modify your institute appartenance in the users menu

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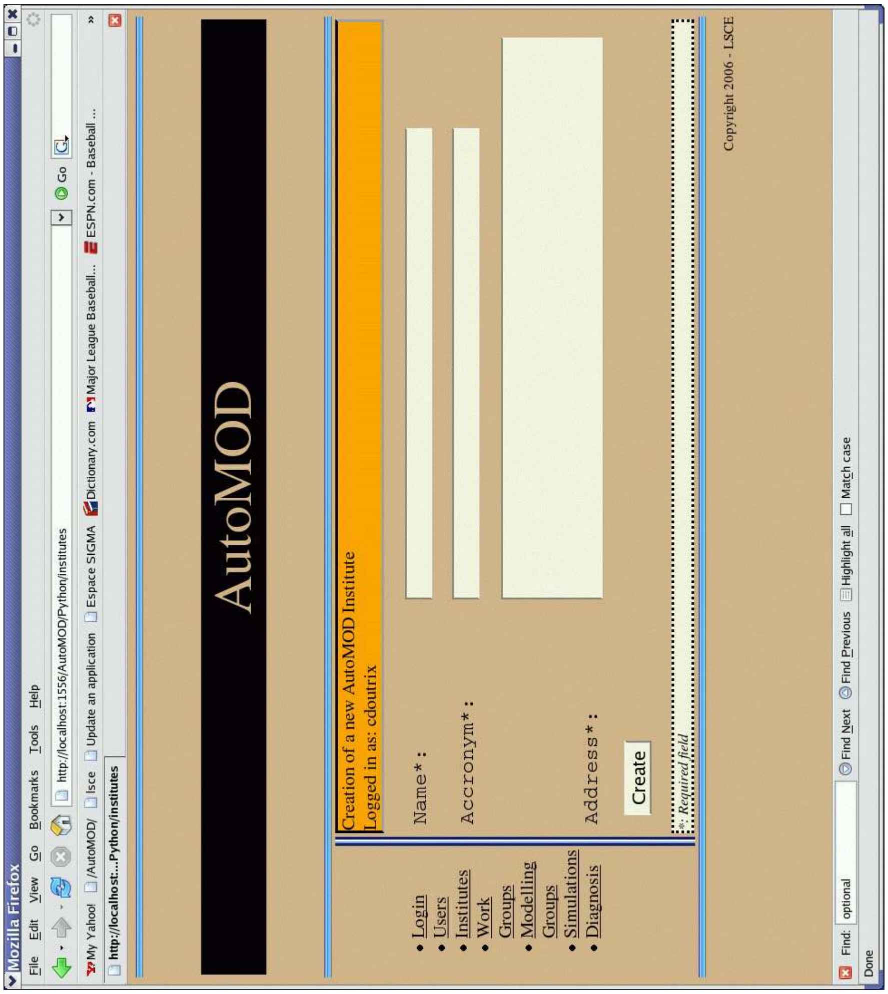
Find: optional

Done

Figure 3.5: The Institutes main page.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Python/institutes
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com Major League Baseball... ESPN.com - Baseball ...
http://localhost:...Python/institutes
AutoMOD
• Login
• Users
• Institutes
• Work Groups
• Modelling Groups
• Simulations
• Diagnosis
Create
Find: optional
Find Next
Find Previous
Highlight all
Match case
Done

Creation of a new AutoMOD Institute
Logged in as: cdoutrix

Name*:

Accronym*:

Address*:

*: *Required field*

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Figure 3.6: Creating a new institute.

3.2.2 Browsing the AutoMOD content

Before anything else, you can use AutoMOD simply to browse its content informations. These can be grouped in different categories.

- Users, Institutes, Groups
- Models, their various versions and simulations
- Diagnoses

The *Users* section

By clicking on **Users** link in the left hand menu (Figure 3.1), you'll access users related features. By clicking on the corresponding buttons, you will be able to either:

- Edit your user info (if logged in) (Figure 3.1).
- Create a new user (see section) (Figure 3.2).
- List informations for all existing users. This list can be ordered by any categorie by clicking on the (asc/desc button at the top desired column) (Figure **??**).
- View informations for only a few users selected from the list
- View informations for a single user by typing its login the space in the last line of the page.

The *Institutes* section

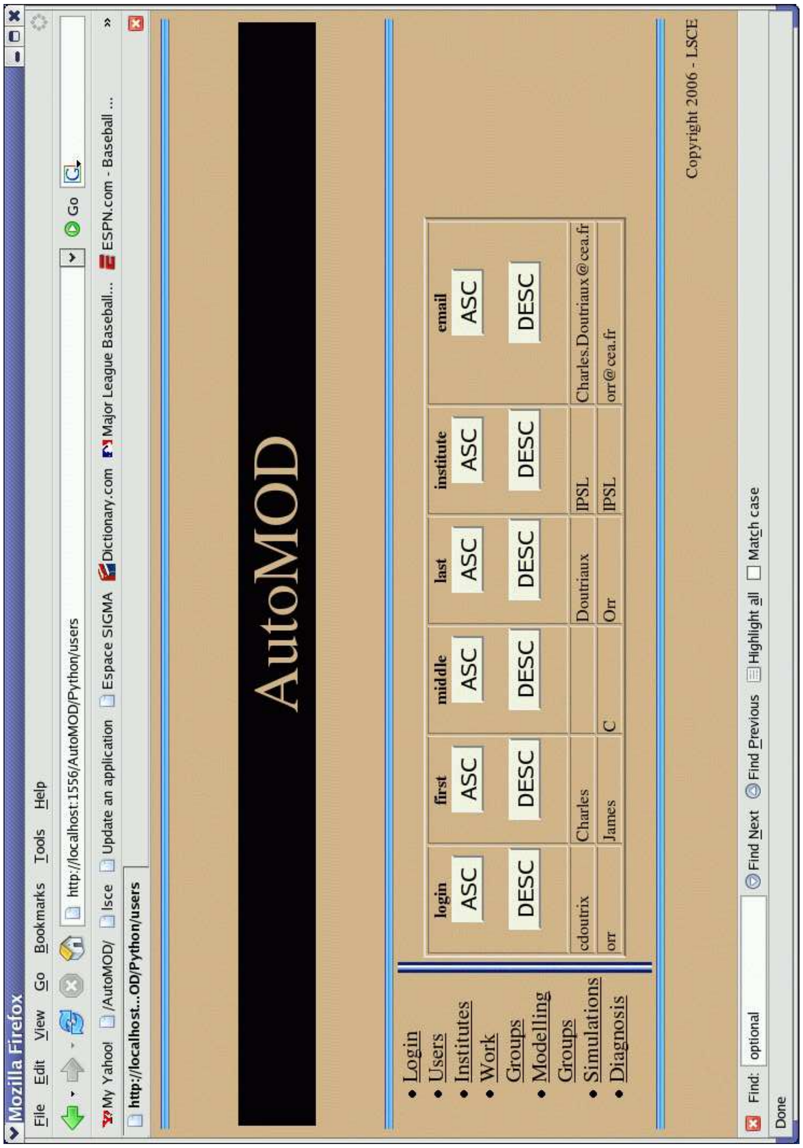
By clicking on the **Institute** link in the left hand menu, you'll access institutes related features. By clicking on the corresponding buttons (Figure 3.5), you will be able to either ***update*** informations about your institute, ***create*** a new institute (Figure 3.6), or simply browse informations about existing insitutes (Figure 3.8).

Models and their versions

By clicking on **Modelling Groups** link in the left hand menu, you'll be able to browse models that are already in the database. Select a Model from the pulldown list (Figure 3.9) and click on the ***View*** button next to it. This will give you all the information about the selected model *and* all of its ***versions*** (Figure 3.10.

Let's use this opportunity to stress the importance of carefully documenting -in as much length as possible- a model and its versions while you're submitting it. Always keep these informations as much up-to-date as possible.

Note that from this section, by clicking on the ***Manage*** button, you can also *update* a model informations (and its associated versions) (Figure 3.11). Note that the list next to manage will only reflect models on which you have *write* permission.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Python/users
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com Major League Baseball... ESPN.com - Baseball ...
http://localhost...OD/Python/users
AutoMOD

- Login
- Users
- Institutes
- Work Groups
- Modelling Groups
- Simulations
- Diagnosis

login	first	middle	last	institute	email
ASC	ASC	ASC	ASC	ASC	ASC
DESC	DESC	DESC	DESC	DESC	DESC
cdoutrix	Charles		Doutriaux	IPSL	Charles.Doutriaux@cea.fr
orr	James	C	Orr	IPSL	orr@cea.fr

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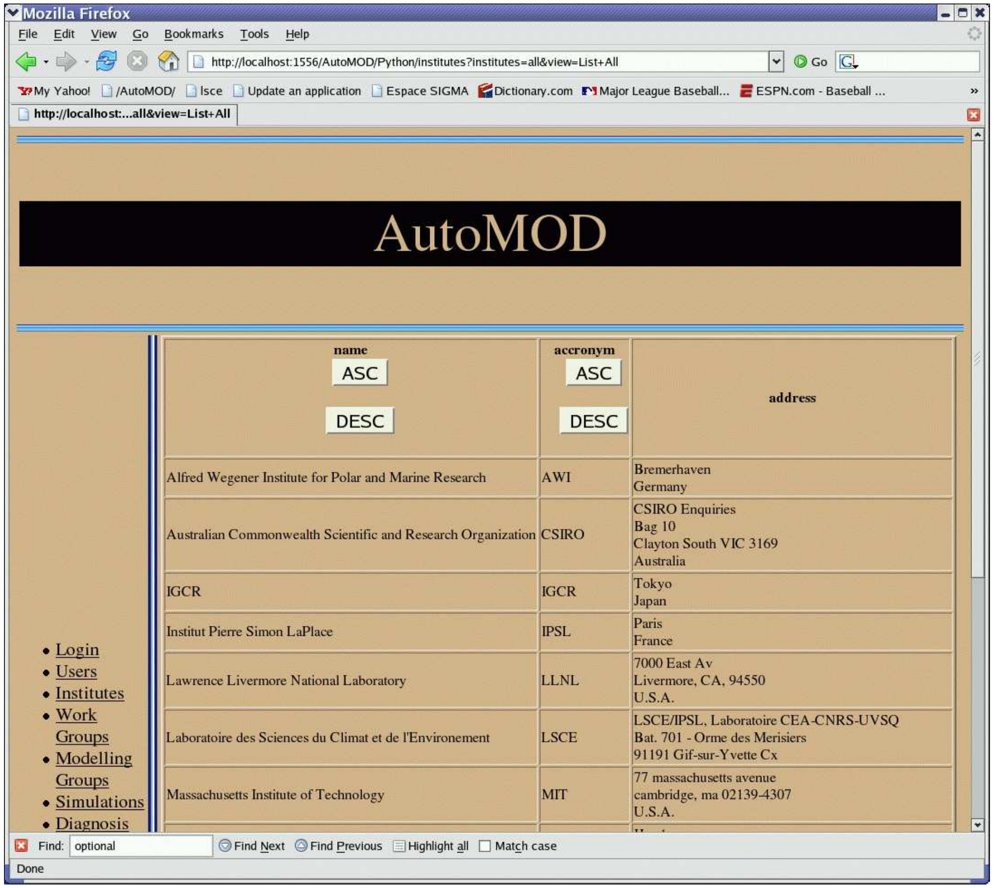
Find: optional
Find Next
Find Previous
Highlight all
□ Match case
Done

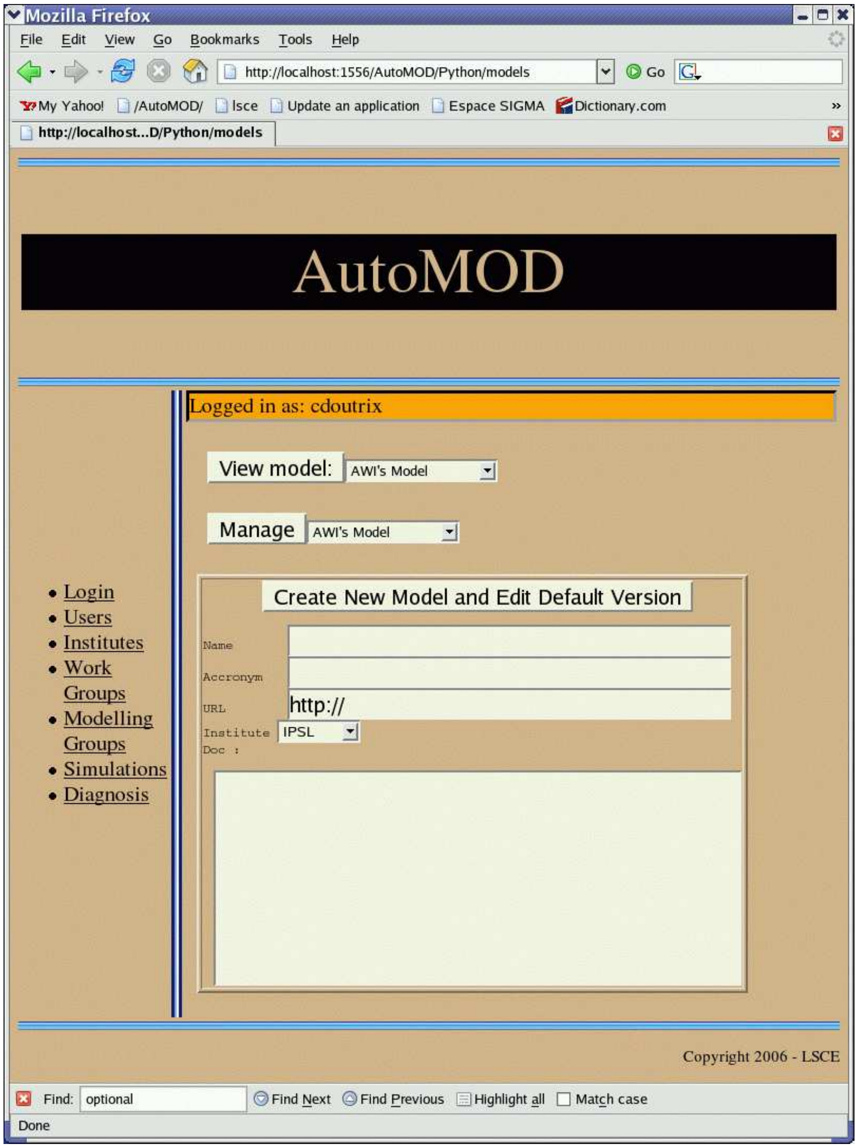
Figure 3.7: Listing users information.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com Major League Baseball... ESPN.com - Baseball ...
http://localhost:...all&view=List+All
AutoMOD
Login
Users
Institutes
Work Groups
Modelling Groups
Simulations
Diagnosis
Find: optional
Find Next
Find Previous
Highlight all
Match case
Done

http://localhost:1556/AutoMOD/Python/institutes?institutes=all&view=List+All

name ASC DESC	accronym ASC DESC	address
Alfred Wegener Institute for Polar and Marine Research	AWI	Bremerhaven Germany
Australian Commonwealth Scientific and Research Organization	CSIRO	CSIRO Enquiries Bag 10 Clayton South VIC 3169 Australia
IGCR	IGCR	Tokyo Japan
Institut Pierre Simon LaPlace	IPSL	Paris France
Lawrence Livermore National Laboratory	LLNL	7000 East Av Livermore, CA, 94550 U.S.A.
Laboratoire des Sciences du Climat et de l'Environement	LSCE	LSCE/IPSL, Laboratoire CEA-CNRS-UVSQ Bat. 701 - Orme des Merisiers 91191 Gif-sur-Yvette Cx
Massachusetts Institute of Technology	MIT	77 massachusetts avenue cambridge, ma 02139-4307 U.S.A.

Figure 3.8: Listing insitutes informations.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Python/models
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com
http://localhost...D/Python/models
AutoMOD
View model:
Manage
Create New Model and Edit Default Version
Find Next Find Previous Highlight all Match case

Logged in as: cdoutrix

View model: AWI's Model

Manage AWI's Model

- Login
- Users
- Institutes
- Work Groups
- Modelling Groups
- Simulations
- Diagnosis

Name

Accronym

URL http://

Institute IPSL

Doc :

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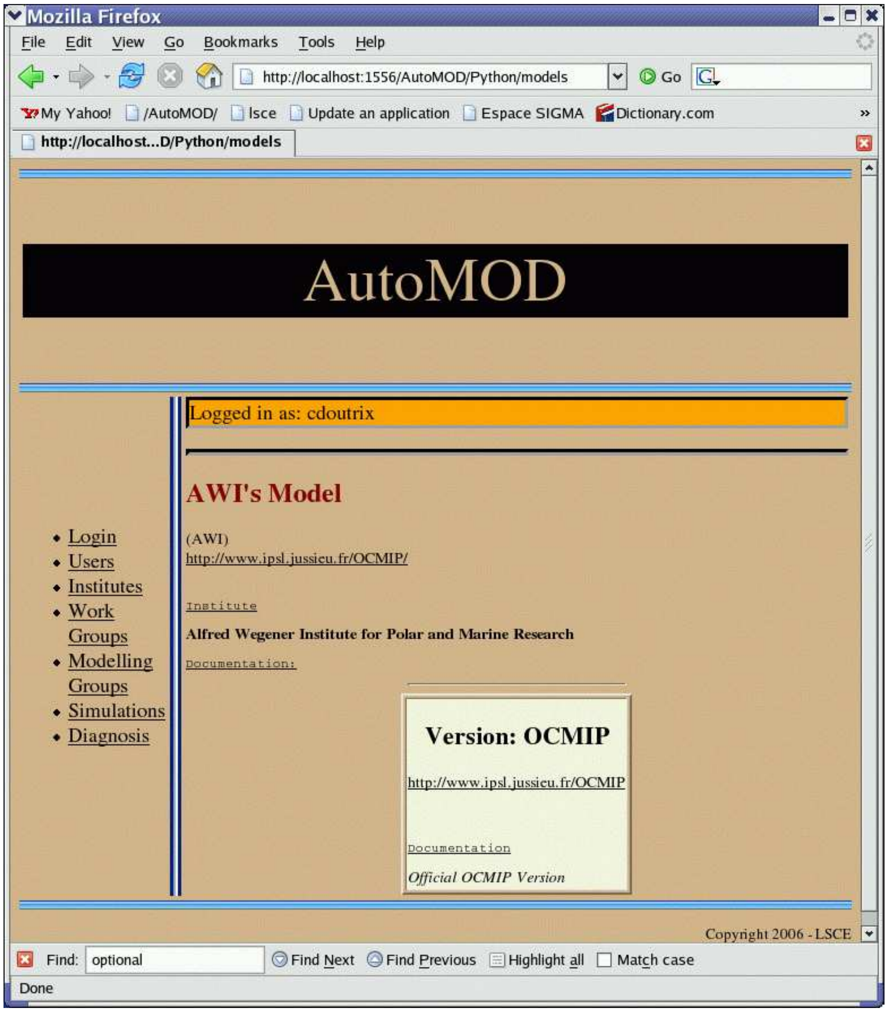
Find: optional

☐ Match case

Done

Figure 3.9: The modelling groups main page.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Python/models
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com
http://localhost...D/Python/models
Find: optional
Find Next Find Previous Highlight all Match case
Done

AutoMOD

Logged in as: cdoutrix

- Login
- Users
- Institutes
- Work Groups
- Modelling Groups
- Simulations
- Diagnosis

AWI's Model

(AWI)
http://www.ipsl.jussieu.fr/OCMIP/

Institute

Alfred Wegener Institute for Polar and Marine Research

Documentation:

Version: OCMIP

http://www.ipsl.jussieu.fr/OCMIP

Documentation

Official OCMIP Version

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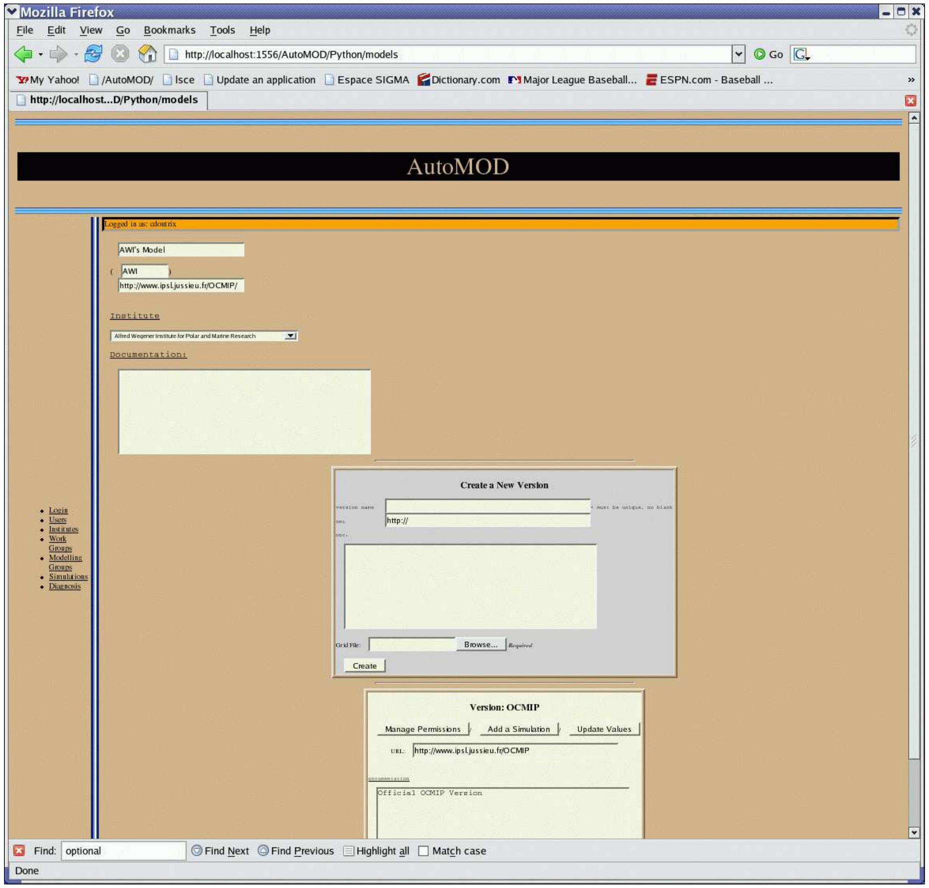
Figure 3.10: Viewing model information.



http://localhost:1556/AutoMOD/Python/models

Logged in as: cdoutrix

AWI's Model

(AWI)

http://www.ipsl.jussieu.fr/OCMIP/

Institute: Alfred Wegener Institute for Polar and Marine Research

version name: * must be unique, no blank

url: http://

doc:

Grid File: Required

Version: OCMIP

URL: http://www.ipsl.jussieu.fr/OCMIP

documentation: Official OCMIP Version

Find: optional

□ Match case

Figure 3.11: Managing information.

Simulations

By clicking on ***Simulations*** link in the left hand menu, you'll be able to obtain a table showing every simulation in the database (Figure 3.13, at least every simulation for which you have *read* permission.
First, in the left-hand list (Figure 3.12, select the Type/Subtype(s) you would like to see listed, then, in the right-hand list, select the Model/Version(s) you would like to see listed. In both case you can also select '*All* or *All with results*.
Click then on the ***Click to List*** button to obtain a table listing the available ***simulations***. The table obtained is color-coded. If no simulation is available for this specific subtype/modelversion combination the cell is then *red*, note that a *Add* button is here to take you to the corresponding upload form. If there is data for the specific combinaison then in addition of the *Add* button, you will see one (single realization) or more (ensemble for exmaple) button(s) representing the various simulation sumbitted, the accronym of the simualtion is listed in the button. Clicking on these button will show you the informations about the simulation.

Diagnosis

By clicking on **Diagnosis** link in the left hand menu, you will be taken to the diagnosis page of AutoMOD (Figure 3.14), simply move your pointer over any diagnosis and informations about this diagnosis will pop up (Figure 3.15). It is also possible for the information to be accompanied by a picture showing an example of what the diagnosis output looks like.

Here again we cannot stress enough how importantit is for developers to document carefuly their diagnosis! AutoMOD diagnosis are built on the Comprehensive Handling of Automated Diagnosis (Comprehensive Handlers for Automated Diagnosis (CHAD)) technology. Such diagnosis can "speak" to server and provide it with information such as documentation or parameters. The Comprehensive Handlers for Automated Diagnosis (CHAD)project provides base classes to build your diagnosis on.

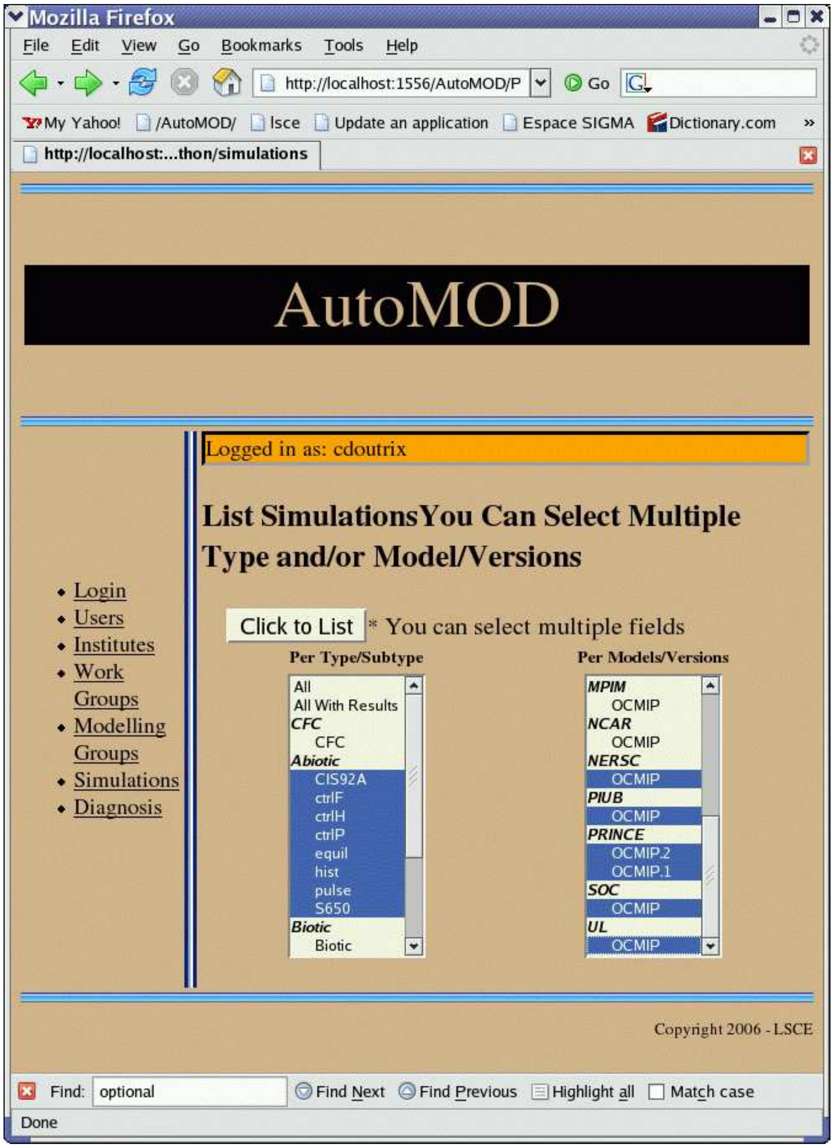
3.3 Adding Information into the AutoMOD system

3.3.1 Users

Users information are controled via the ***Users*** link in the left hand menu.

Creating a new user

Click on the ***Create new user*** button. You are then taken to a form (Figure 3.2), fill this form according to your personal informations. Select carefully the password and *DO NOT SHARE IT WITH ANYBODY.*
Click on ***Create***. And you're done.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/P
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com
http://localhost:...thon/simulations
AutoMOD
Login
Users
Institutes
Work Groups
Modelling Groups
Simulations
Diagnosis
Click to List
Copyright 2006 - LSCE
Find Next
Find Previous
Highlight all
Match case
Done

Logged in as: cdoutrix

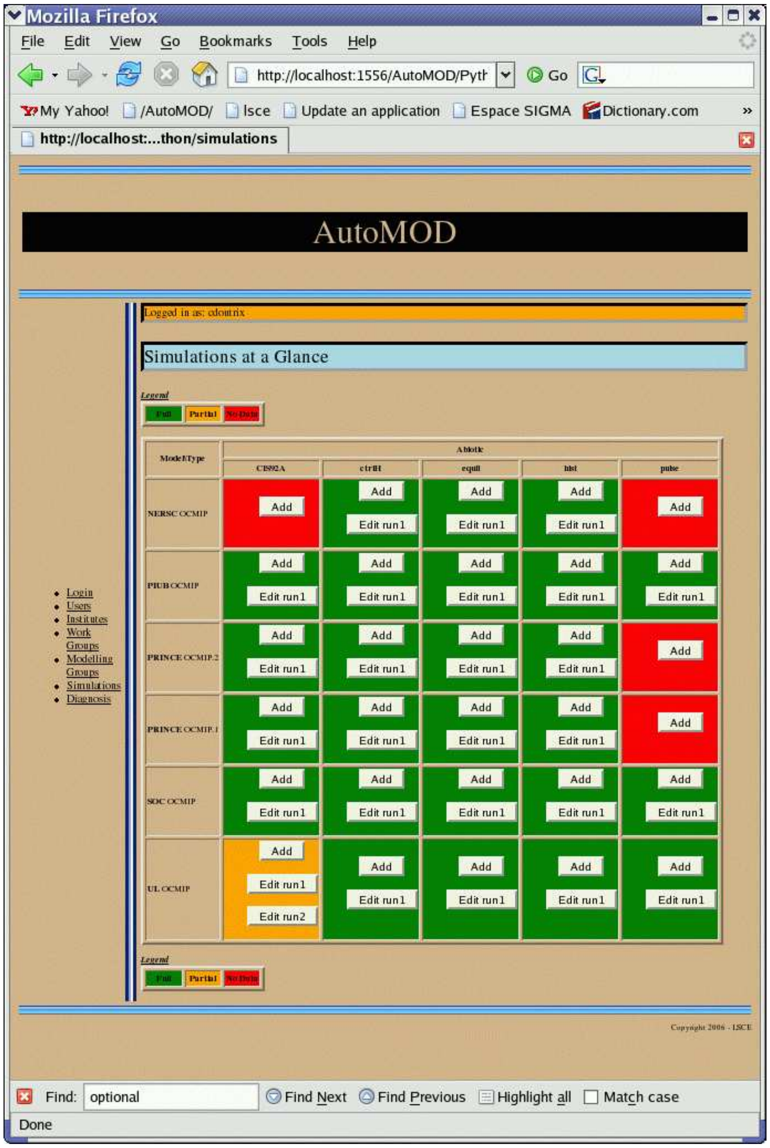
List SimulationsYou Can Select Multiple Type and/or Model/Versions

Click to List * You can select multiple fields

Per Type/Subtype	Per Models/Versions
All	MPIM
All With Results	OCMIP
CFC	NCAR
CFC	OCMIP
Abiotic	NERSC
CIS92A	OCMIP
ctrlF	PIUB
ctrlH	OCMIP
ctrlP	PRINCE
equil	OCMIP.2
hist	OCMIP.1
pulse	SOC
S650	OCMIP
Biotic	UL
Biotic	OCMIP

Find: optional

Figure 3.12: Selecting simulations to list.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Pyth
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com »
http://localhost:...thon/simulations
Find: optional
Find Next
Find Previous
Highlight all
☐ Match case
Done

AutoMOD

Logged in as: cdoutrix

Simulations at a Glance

Legend

🟩 Full 🟧 Partial 🟥 No Data

- Login
- Users
- Institutes
- Work Groups
- Modelling Groups
- Simulations
- Diagnosis

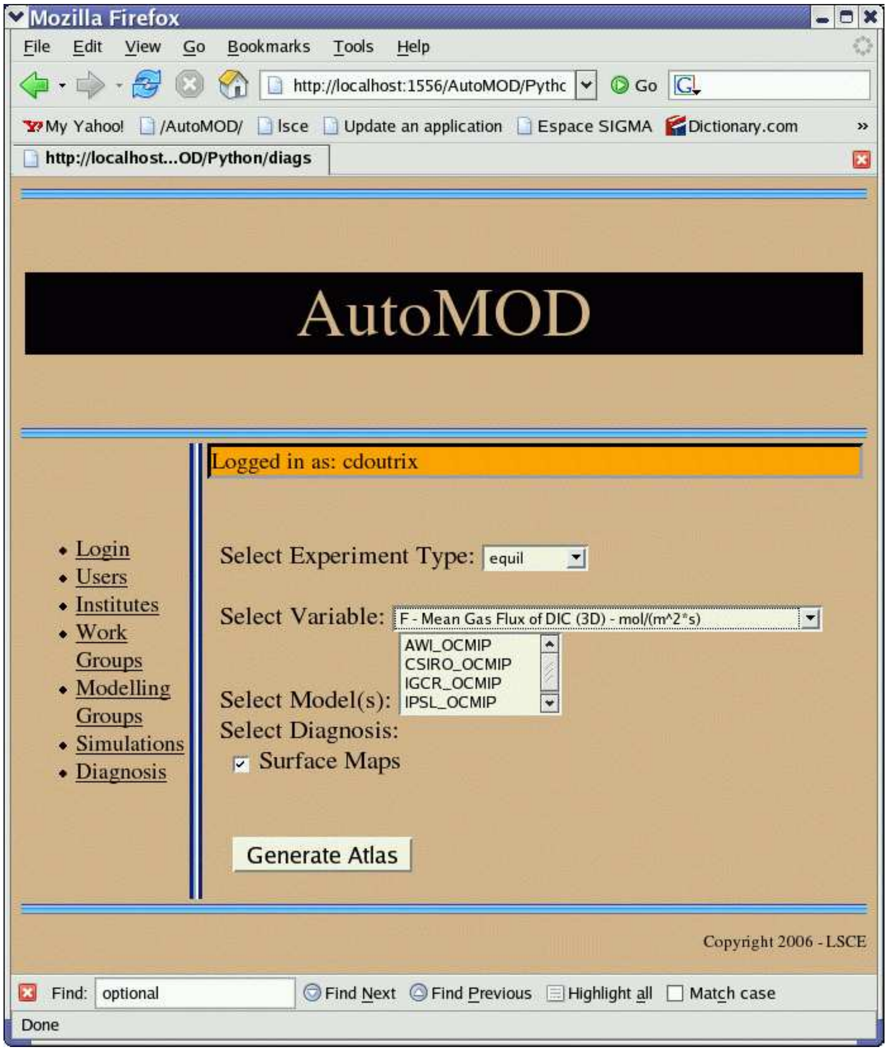
ModelType	Abiotic				
	CIS92A	ctrlH	equil	hist	pulse
NERSC OCMIP	🟥 Add	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1	🟥 Add
PIUB OCMIP	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1
PRINCE OCMIP.2	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1	🟥 Add
PRINCE OCMIP.1	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1	🟥 Add
SOC OCMIP	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1
UL OCMIP	🟧 Add Edit run1 Edit run2	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1	🟩 Add Edit run1

Legend

🟩 Full 🟧 Partial 🟥 No Data

Copyright 2006 - LSCE

Figure 3.13: The simulations table.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Pythc
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com
http://localhost...OD/Python/diags
AutoMOD
Login
Users
Institutes
Work Groups
Modelling Groups
Simulations
Diagnosis
Generate Atlas
Find: optional
Find Next
Find Previous
Highlight all
Match case
Done

Logged in as: cdoutrix

Select Experiment Type: equil

Select Variable: F - Mean Gas Flux of DIC (3D) - mol/(m^2*s)

Select Model(s): AWI_OCMIP, CSIRO_OCMIP, IGCR_OCMIP, IPSL_OCMIP

Select Diagnosis:

☑ Surface Maps

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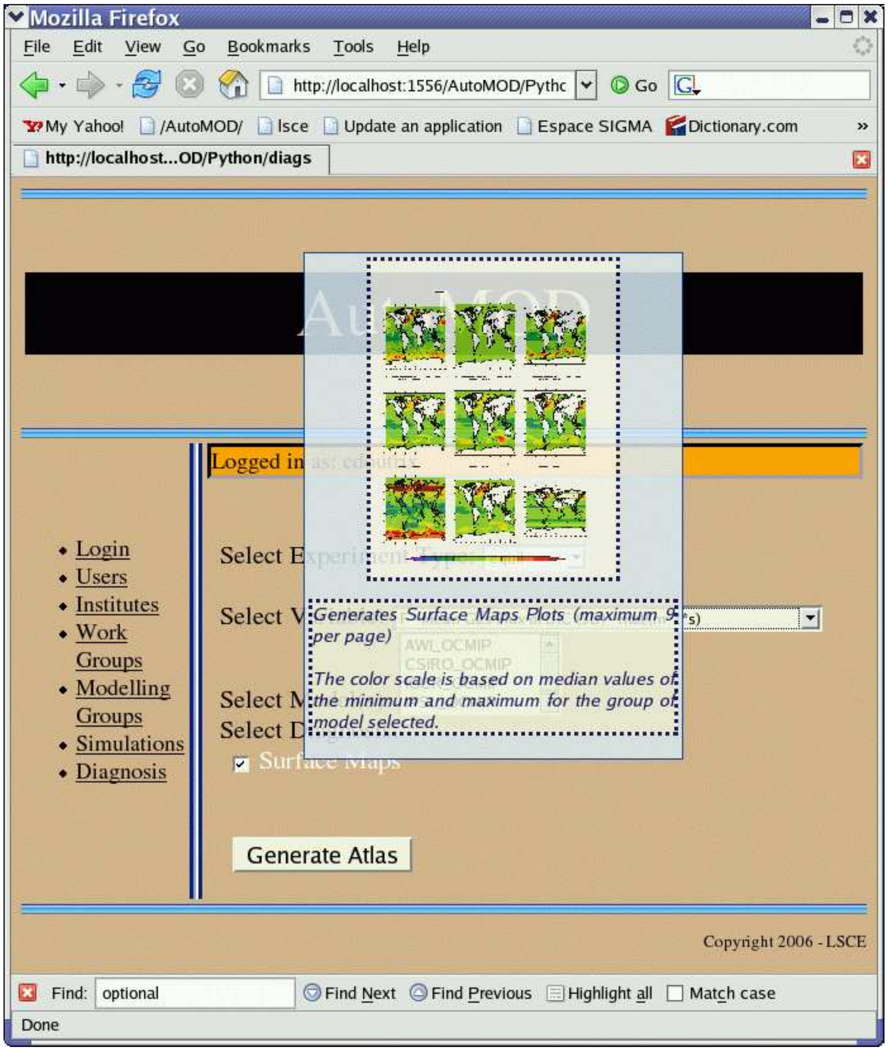
Figure 3.14: Generating Atlases.



Generates Surface Maps Plots (maximum 9 per page)

The color scale is based on median values of the minimum and maximum for the group of model selected.

Figure 3.15: Popup information about a diagnosis.

Modifying your personal informations

Once you are logged in you can update your personal information at any time by clicking on ***Users*** link in the left hand menu, and then on ***Edit "your_login" infos***. You are then sent to a form with your current information, modify them as you wish and click ***Update***.

3.3.2 Institutes

Click on the ***Insitutes*** link in the left hand menu. This takes you to the institute section (Figure 3.5). From there on can ***Create New A Institute*** by clicking on the corresponding button. You may then go the ***Users*** section and update your personal info to reflect this new institute if you wish.

3.3.3 Work Groups

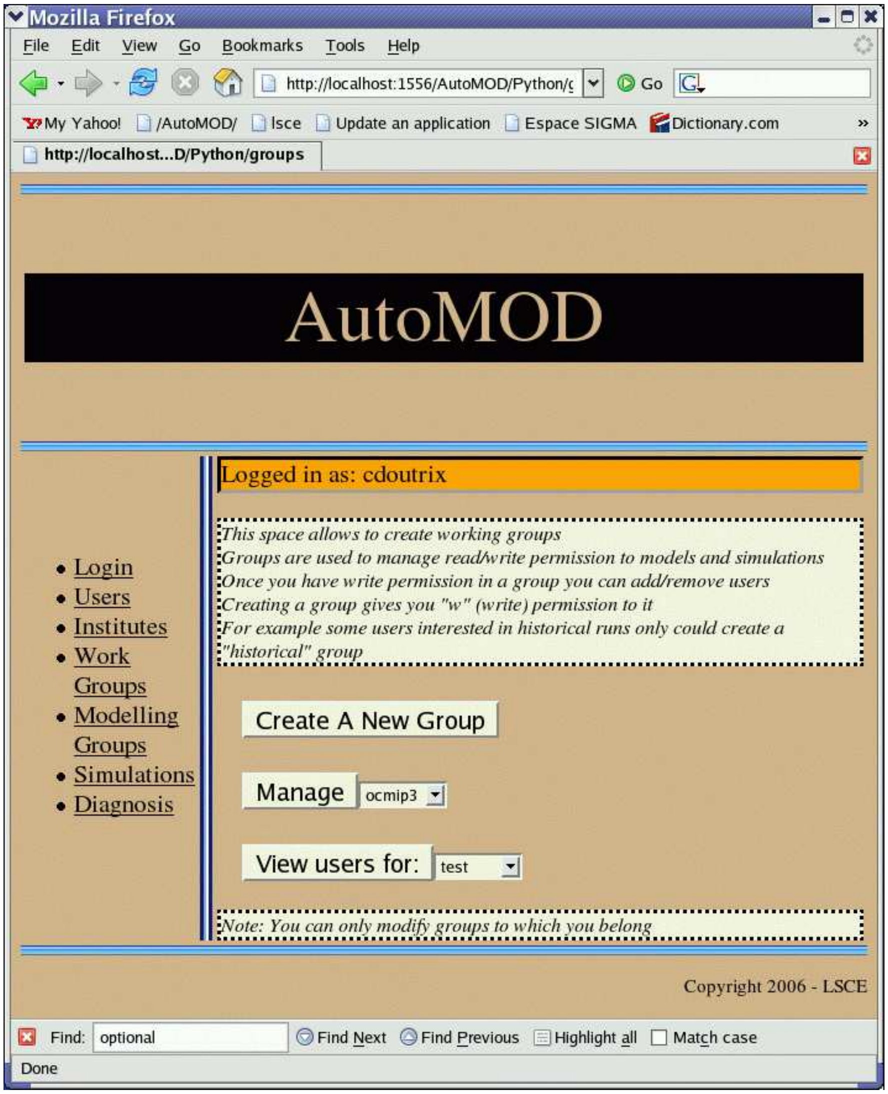
Work group in AutoMOD exists solely for *read/write permissions* purposes. By clicking on the ***Work Groups*** link in the left hand menu you will be be taken to the corresponding section (Figure 3.16). From there you can ***Create A New Group*** (Figure **??**, ***View*** users of a group (Figure **??**), or ***Manage*** users of a group you belong to.

3.3.4 Defining a new Model in AutoMOD

Everytime a new modelling groups desires to join your AutoMOD project, it will need to be added to the database. Once again we cannot stress enough how important the need for a *detailed documentation* is.
In order to add a modelling group to an AutoMOD project, click on the ***Modelling Groups*** link in the left hand menu to access the corresponding section (Figure 3.9). Note that if you already have a model in the database, this is the location from which you can ***Manage*** the data (Figure **??**). In the case of a new model, simply fill the form and click ***Create New Model***. At that point you'll be carried to the form to add a new version to your model (Figure **??**). Adding a model version are described in section 3.3.5. *Note: You can enter $\LaTeX\,2_\varepsilon$commands in the documentation section.*

3.3.5 Adding version(s) to a model in AutoMOD, updating a model's information

Click on the ***Modelling Groups*** link in the left hand menu. This takes you to the location from which you can ***Manage*** the model (Figure **??**). This means that you will be able to **emphadd a new version**, **emphedit an existing version**, or **emphupdate the model version's information**. To do any of these action, select the desired model from the pulldown list next to the ***Manage*** button, then click on this button.
On the following form you can update/edit information (Figure **??**).


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Python/g
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com
http://localhost...D/Python/groups
AutoMOD
Login
Users
Institutes
Work Groups
Modelling Groups
Simulations
Diagnosis
Create A New Group
Manage
View users for:
Find Next
Find Previous
Highlight all
Match case
Done

Logged in as: cdoutrix

This space allows to create working groups
Groups are used to manage read/write permission to models and simulations
Once you have write permission in a group you can add/remove users
Creating a group gives you "w" (write) permission to it
For example some users interested in historical runs only could create a "historical" group

Manage: ocmip3

View users for: test

Note: You can only modify groups to which you belong

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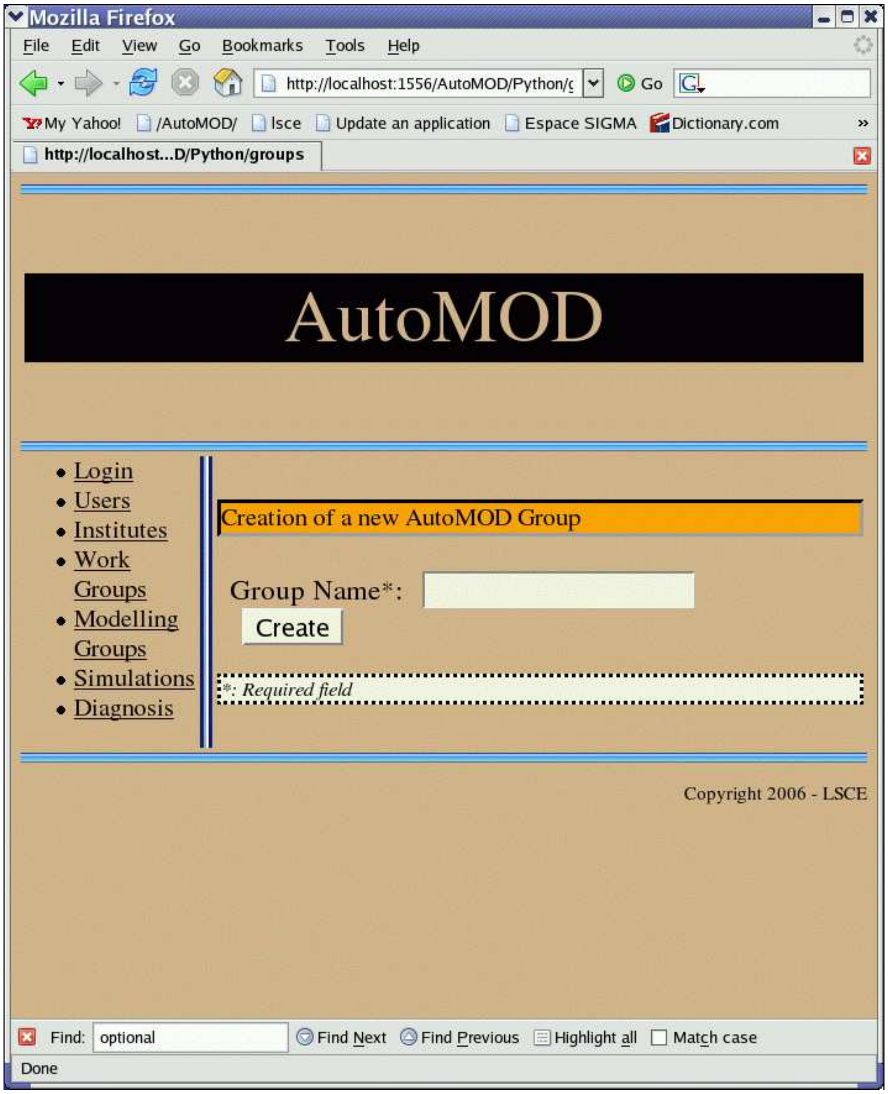
Find: optional

Figure 3.16: Working groups main page.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Python/g
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com »
http://localhost...D/Python/groups
Find: optional
Find Next Find Previous Highlight all Match case
Done

AutoMOD

- Login
- Users
- Institutes
- Work Groups
- Modelling Groups
- Simulations
- Diagnosis

Creation of a new AutoMOD Group

Group Name*:

Create

*: Required field

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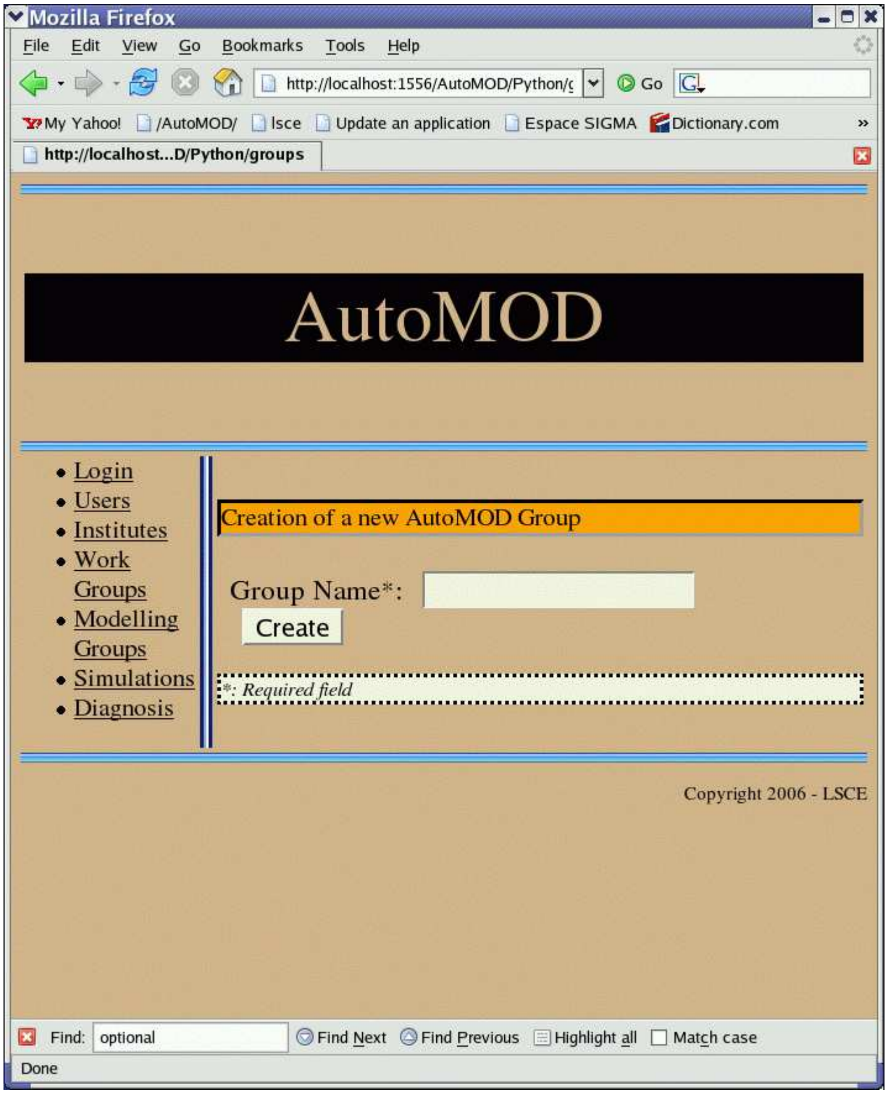
Figure 3.17: Creating a new work group.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Python/g
Go
My Yahoo! /AutoMOD/ lsce Update an application Espace SIGMA Dictionary.com
http://localhost...D/Python/groups
AutoMOD
Login
Users
Institutes
Work Groups
Modelling Groups
Simulations
Diagnosis
Create
Find Next Find Previous Highlight all Match case
Done

Creation of a new AutoMOD Group

Group Name*:

*: Required field

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Find: optional

Figure 3.18: Listing users of a working group.

Adding a Version

In order to add a new version to a model, you will need to complete the short form bellow the model's information (Figure **??**). *Most importantly* you will be asked to provide at that point a ***Grid File*** for this version. Indeed AutoMOD allows for the *associate_file* CF extension which dispense the actual data to include the grid information in them.
The grid you provide should be either in ***CF compliant*** format or produced via the ***OCMIP*** project output routines.

Updating Model Information

Simply change the desired information about the model, where appropriate and click on any of the ***Update Values*** in the model versions.

3.3.6 Creating "Simulations" for a model version and uploading the data

There is 2 ways to access the ***Add Simulation*** section':

- Click on the ***Modelling Groups*** link in the left hand menu. Select the desired model from the pulldown list next to the ***Manage*** button (Figure 3.9), click on this button. Then in the section corresponding to the desired version of the model click on ***Add a Simulation*** (Figure **??**).

- Click on the ***Simulation*** link in the left hand menu. Select the desired ***simualtion type*** (or ***All***) in the type list, select ***your model version*** in the model list (or ***All***), click on ***Click to List*** (Figure 3.12). In the produced table (Figure 3.13), click on the ***Add*** button.

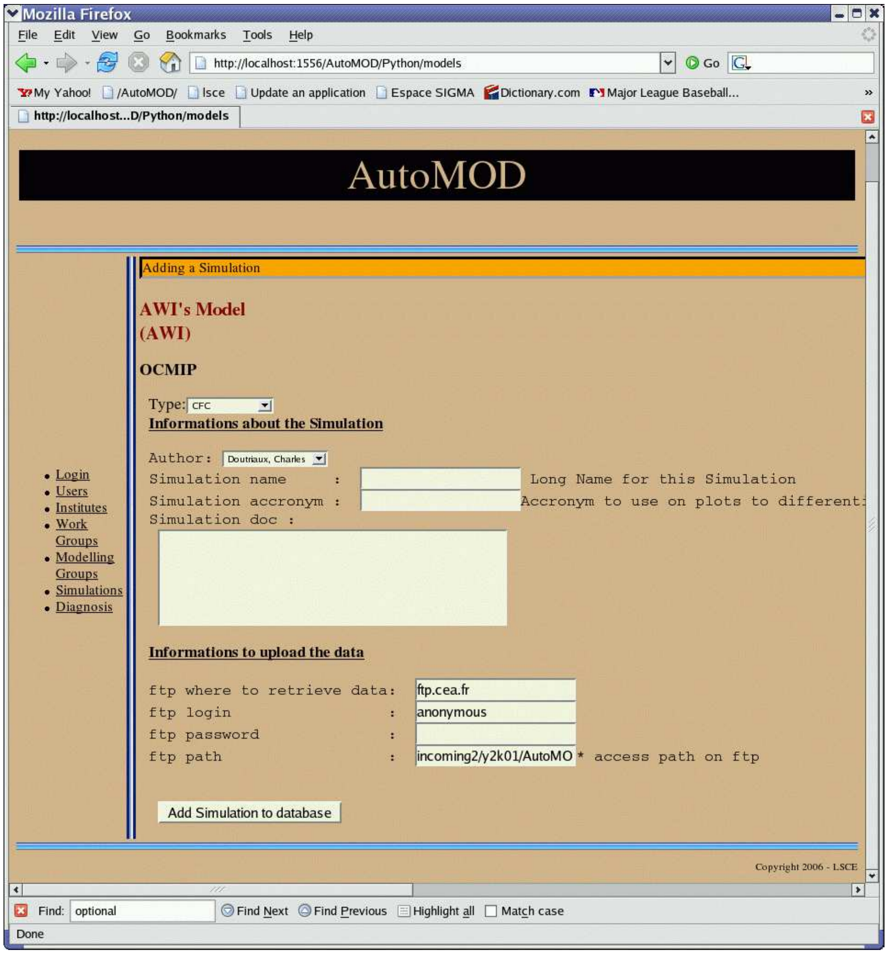
You are now on the ***Adding a Simulation*** page (Figure 3.19).

Documenting the Simulation

Make sure you pick the right ***Type*** in the pulldown list and the right ***Author*** for this simulation (Figure 3.19. Give a long a ***Name*** this name will be used as a long name, mostly in documentation sections. Pick an ***Accronym*** for this simulation, it will be used in diagnosis output. *Take great care of the documentation* section, as it will be used in the atlases produced by AutoMOD, you can enter LaTeX 2_εcommands. At that point you can go on to the "uploading data" section.

Uploading data

Currently data are uploaded into the AutoMOD system via ftp. Simply put your ***CF compliant*** data onto your ftp site. At the bottom of the page (Figure 3.19), fill in the information on how to access this ftp site (ftp site, login, password, directory). Click on ***Add Simulation to Database*** button.


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Python/models
Go
My Yahoo! /AutoMOD/ Isce Update an application Espace SIGMA Dictionary.com Major League Baseball...
http://localhost...D/Python/models
AutoMOD
Login
Users
Institutes
Work Groups
Modelling Groups
Simulations
Diagnosis
Add Simulation to database
Copyright 2006 - LSCE
Find Next
Find Previous
Highlight all
Match case
Done

Adding a Simulation

AWI's Model
(AWI)

OCMIP

Type: CFC

Informations about the Simulation

Author: Doutriaux, Charles
Simulation name : Long Name for this Simulation
Simulation accronym : Accronym to use on plots to differenti
Simulation doc :

Informations to upload the data

ftp where to retrieve data: ftp.cea.fr
ftp login : anonymous
ftp password :
ftp path : incoming2/y2k01/AutoMO * access path on ftp

Find: optional

Figure 3.19: Adding a new simulation.

Congratulation in a few moments your data will be available to the AutoMOD users.

Note: AutoMOD compliant data can be obtained using OCMIP4 output subroutine, availible at: http://www.ipsl.jussieu.fr/OCMIP/phase4/simulations/OCMIP4/HOWTO-OCMIP4.html
. One can also simply use the CF Conventions

3.3.7 Controlling who has access to the data

We explained it earlier, AutoMOD allows you to control who actually has access to your data. This can be done at ***Simulation*** level or at the ***Model Version level***, the later one preempting over the earlier.
Whether you controlling access to a single simulation or to a model version, the process is exactly the same. The two access pages can be obtained as follow

- **Model Version Control Page:** Click on the ***Modelling Groups*** link in the left hand menu. Select the desired model from the pulldown list next to the ***Manage*** button, click on this button. Click on the ***Manage Permission*** button of the corresponding version.

- Click on the ***Simulation*** link in the left hand menu. Select the desired ***simualtion type*** (or ***All***) in the type list, select ***your model version*** in the model list (or ***All***), click on ***Click to List***. In the produced table, click on the ***Edit*** button. Click on the ***Manage Permission*** button (not implemeted yet).

You are now on the permissions page (Figure 3.20).

Permission can be granted for ***Working Groups*** or per ***User***. For any of these categories you can either ***Grant*** or ***Deny*** privileges. There are two kind of privileges.

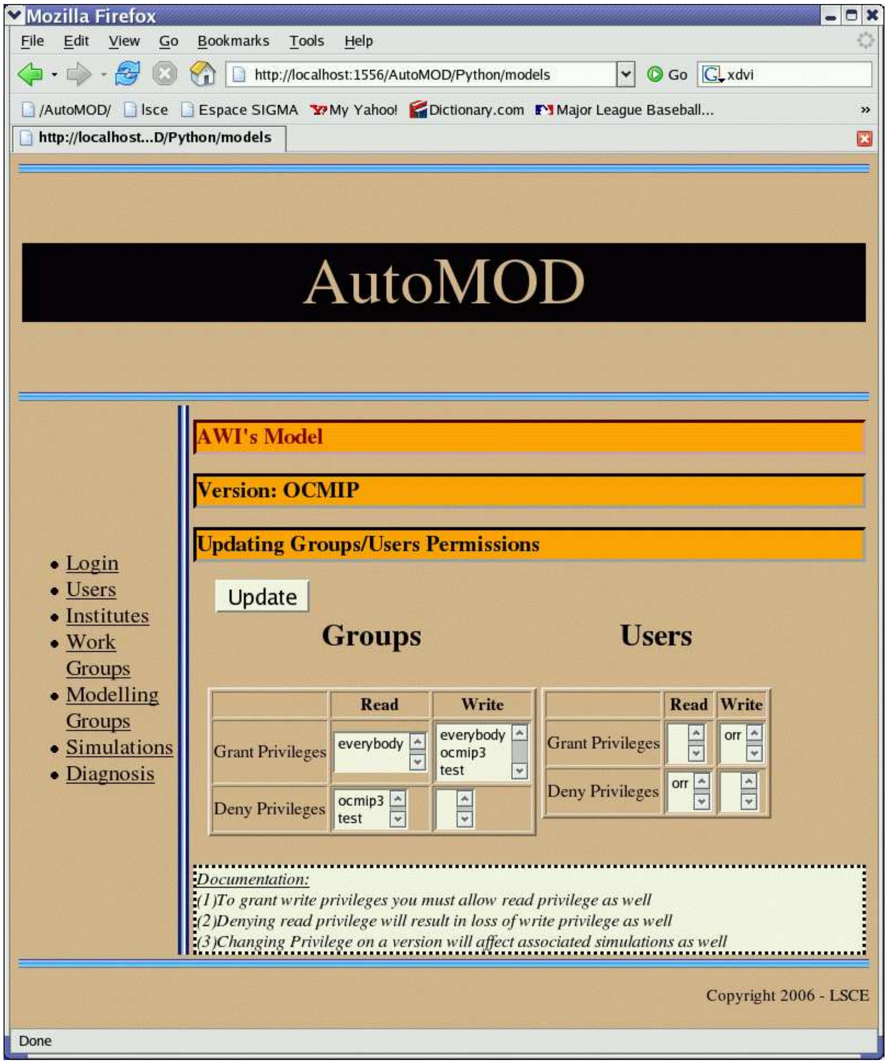
- ***Read Privileges***: Which allow the user/group to see the information or perform analysis.

- ***Write Privileges***: Which allow the user/group to access and change the informations, including adding simulations.

In each *action*, select the user(s)/group(s) you want to affect, and click on ***Update***.
For example to make a model version *private* to everybody but users of the group *mygroup*. In the Groups tables, select ***everybody***) in the list corresponding the ***Deny Privileges*** row, in the ***Read*** colum. Similarly select ***mygroup*** in the ***Grant Privileges*** row, in the ***Read*** colum. Click on Update, you're done.

3.4 Generating Atlases

The main attraction of the AutoMOD system is of course its *Atlas generating'* function. Customizedf Atlases can be generated via the Diagnosis section in the left-hand menu (Figure 3.14).


Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://localhost:1556/AutoMOD/Python/models
Go
xdvi
/AutoMOD/ lsce Espace SIGMA My Yahoo! Dictionary.com Major League Baseball...
http://localhost...D/Python/models
AutoMOD
Login
Users
Institutes
Work Groups
Modelling Groups
Simulations
Diagnosis
Update
Copyright 2006 - LSCE
Done

AWI's Model

Version: OCMIP

Updating Groups/Users Permissions

Groups

	Read	Write
Grant Privileges	everybody	everybody ocmip3 test
Deny Privileges	ocmip3 test	

Users

	Read	Write
Grant Privileges		orr
Deny Privileges	orr	

Documentation:
(1)To grant write privileges you must allow read privilege as well
(2)Denying read privilege will result in loss of write privilege as well
(3)Changing Privilege on a version will affect associated simulations as well

Figure 3.20: Changing Permissions.

3.4.1 Getting informations about diagnosis

Available diagnosis are listed at the bottom of the form. Simply pass your mouse over any of them and a baloon window will pop up listing information about the diagnosis, if provided by the developer a picture is even displayed with the information (Figure 3.15).

3.4.2 Generating an Atlas

Generating an Atlas is basically a 4 step process (Figure 3.14)

1. Select an experiment type.
2. Select the variable you wish to use.
3. Select the model(s) you would like to use.
4. Check all the daignoses you're interested in.

Note: You can do this in any order, but everytime you change one step the following ones are affected. For example, changing an experiment affect which variables and models are available.
Note also that some diagnosis impose restriction on the type of variable you can use, for example "Surface Maps" diagnoses will require lat/lon and therefore variables which do not have these dimensions will be removed from the list of available variables.

3.4.3 Tuning aspects of a diagnsosis

Not implemented yet

Chapter 4

Customizing AutoMOD

4.1 Adding New Diagnosis

It is fairly easy to add new diagnosis to the AutoMOD project. *But* diagnoses must comply to the Comprehensive Handlers for Automated Diagnosis (CHAD)conventions. A complete description of the conventions can be found on the CHADwebsite. As far as the AutoMOD project is concerned the principal requirements are:

- –toXml option producing the Diagnosis description text string in XML format
- capable of understanding the following input options
  - –*variable*: Name of variable to process
  - –*files*: Name of files to process in style: (

    $$'file1',' file2',\ldots$$

)
  - –*outdir*: Path where to output results
- standard output from diagnosis must contain a line starting with the *images* string followed by a python-evaluable list with the *FULL* path to output images, i.e.:

  $$'path1/image1','path2/image2',\ldots$$

Optional but *HIGHLY* recommanded specifications are:

- *info* tag in the XML description, with sub tags:
  - *name*: Long name to be displayed in the form and in the Atlas.
  - *doc*: Diagnosis documentation, can contain LaTex commands, but would be displayed in pop up window
  - *requirements*: Diagnosis restrictions, at the moment recognized subtags are

- ∗ *units*: Must have units for the variable, in cdms.orderparse format

As a reminder in the [AutoMOD_DIR]/Python/Diagnosis directory, there is a file called *Diagnosis.py*, this file contains the constructor for “AutoMOD” class, a subclass of Comprehensive Handlers for Automated Diagnosis (CHAD)class, that can be used as a starter to build new python-based diagnosis.

4.2 Customizing the web-interface, the diags.py file

Expert users can edit the [AutoMOD_DIR]/Python/diags.py file to their desires. This allows you to modify the order of selection, the selections themselves, etc...

4.2.1 Basic appearance changes

We will not come back in this section on fine-tuning the styles.css file in the [AutoMOD_DIR]. In the [AutoMOD_DIR]/Python/diags.py file, there are a few things you can edit.

The Diagnosis Popup Window

Near the end of the *default_form* function, look for the line controlling aspects of the wz_tooltip. Right now the script controls the *OPACITY* but the wz_tooltip package let you control a lot more things.

4.2.2 Advanced changes, selection order, etc . . .

This will require some *serious* recoding. We will try to describe what the main functions of the current version(1.0) does.

- *handler*: Main function to reroot request to the “Diagnosis” section
- *default_form*: The main form, the one where you select elements for the Diagnosis
- *getDOMS*: Gets the DOM objects for each diagnosis, running the –toXml commands. You could edit this if your diagnosis isn’t fully CHADcompliant.
- *generateAtlas*: Process the Atlas request, creates the Atlas LaTeXheaders, the python script to run all the diagnosis with the right input arguments and post-processing to incorporate diagnosis results into the Atlas LaTeXdocument. This function process the information in the following order
  - Checks *user*.
  - Creates pull down list with *experiments* the user can access.
  - Checks if any diagnosis selected has variable restrictions.
  - Creates pull down list of *variables*.
  - Creates list of *Diagnoses* available with associated popup windows.

4.3 Customizing the back end

4.3.1 Data Serving

At the moment the data are stored locally and directly acces from the hard-drive (preferably in a place not visible from the web-server). But one could envision a system where data are also served via an OpenDAP server. IN order to do this we would recommend to:

- edit the *process_simul.py* file in the [AutoMOD_DIR]/Install directory to reflect data publishing.
- edit the web interface to add a link to the OpenDAP server page ([AutoMOD_DIR]/menu.html)

Appendix A

Appendix: Developping Diagnosis

A.1 Generalities

As mentioned in 4.1 diagnosis must be Comprehensive Handlers for Automated Diagnosis (CHAD)compliant.

A.2 Mapping between Grids, the SCRIP approach

Most intercomparison project will necessit development of diagnosis able to go from one grid to another. In the case of “general” grids, this can be tricky. CDAT’s able to take advantage of mapping files generated by the SCRIP software

A.2.1 SCRIP

The SCRIP is a software package which computes addresses and weights for remapping and interpolating fields between grids in spherical coordinates. It was written originally for remapping fields to other grids in a coupled climate model, but is sufficiently general that it can be used in other applications as well. The package should work for any grid on the surface of a sphere. SCRIP currently supports four remapping options:

- *Conservative remapping* First and secondorder conservative remapping as described in Jones (1999, Monthly Weather Review, 127, 2204-2210).

- *Bilinear interpolation* Slightly generalized to use a local bilinear approximation (only logically-rectangular grids).

- *Bicubic interpolation* Similarly generalized (only logically-rectangular grids).

- *Distance-weighted averaging* Distance-weighted average of a user-specified number of nearest neighbor values.

A.2.2 SCRIP and CDAT

CDAT's cdms is able to understand remapping file generated by SCRIP, following is an example of remapping using SCRIP map files.

```
## s is a cdms variable with a grid known by cdms
## rmp1 is a string pointing to a SCRIP remapping file from the grid in s to
print 'Remapping using : ',rmp1
frmp1=cdms.open(rmp1)
remapper=regrid.readRegridder(frmp1)
s1=remapper(s) # Remap
fout=cdms.open(acc+'_remapped_to_1x1.nc','w')
fout.write(s1)
fout.close()
```

It can be useful to know this while developing diagnosis.

A.2.3 Generating SCRIP remap files for an AutoMOD project

In the directory "Install" you will find a python script named **create_remap_SCRIP_files.py**. This script text a text file as input and created SCRIP reampping files for all modelversion avaialble in your database The input text file consist of a list of target files Each line must contains 3 arguments file_path file_var accronym

where:

- *file_path*: is a location where the target file is
- *file_var*: is the varialbe in this file to use as a target grid (cdms must be able to read its grid).
- *accronym*: an accronym used to create the remapping file names

The script will then loop thru all line and generated for each line the mapping files to go from a modelversion to the target and back. For each modelversion containe din the database.

Appendix B

Appendix: MySQL Tables

In this appendix we will show all the needed MySQL tables and there component.

B.1 admin

```
+-------+--------------+------+-----+---------+-------+
| Field | Type         | Null | Key | Default | Extra |
+-------+--------------+------+-----+---------+-------+
| id    | mediumint(9) | NO   |     |         |       |
+-------+--------------+------+-----+---------+-------+
```

B.2 ftp

```
+--------+--------------+------+-----+---------+-------+
| Field  | Type         | Null | Key | Default | Extra |
+--------+--------------+------+-----+---------+-------+
| sid    | mediumint(9) | YES  |     |         |       |
| ftp    | char(80)     | NO   |     |         |       |
| login  | char(30)     | NO   |     |         |       |
| passwd | char(30)     | YES  |     |         |       |
| path   | char(255)    | NO   |     |         |       |
+--------+--------------+------+-----+---------+-------+
```

B.3 groups

```
+-------+--------------+------+-----+---------+----------------+
| Field | Type         | Null | Key | Default | Extra          |
+-------+--------------+------+-----+---------+----------------+
| id    | mediumint(9) | NO   | PRI |         | auto_increment |
| name  | char(20)     | NO   |     |         |                |
| open  | tinyint(4)   | NO   |     | 0       |                |
+-------+--------------+------+-----+---------+----------------+
```

B.4 groups_users

```
+---------+--------------+------+-----+---------+-------+
| Field   | Type         | Null | Key | Default | Extra |
+---------+--------------+------+-----+---------+-------+
| groupid | mediumint(9) | NO   |     |         |       |
| userid  | mediumint(9) | NO   |     |         |       |
+---------+--------------+------+-----+---------+-------+
```

B.5 institutes

```
+----------+--------------+------+-----+---------+----------------+
| Field    | Type         | Null | Key | Default | Extra          |
+----------+--------------+------+-----+---------+----------------+
| id       | mediumint(9) | NO   | PRI |         | auto_increment |
| name     | char(255)    | NO   |     |         |                |
| accronym | char(30)     | NO   |     |         |                |
| address  | text         | YES  |     |         |                |
+----------+--------------+------+-----+---------+----------------+
```

B.6 mod_perm

```
+-------+--------------+------+-----+---------+-------+
| Field | Type         | Null | Key | Default | Extra |
+-------+--------------+------+-----+---------+-------+
| mvid  | mediumint(9) | NO   |     |         |       |
| type  | tinyint(1)   | YES  |     | 0       |       |
| id    | mediumint(9) | NO   |     |         |       |
| r     | tinyint(1)   | YES  |     | 1       |       |
| w     | tinyint(1)   | YES  |     | 0       |       |
+-------+--------------+------+-----+---------+-------+
```

B.7 models

```
+------------+---------------+------+-----+---------+----------------+
| Field      | Type          | Null | Key | Default | Extra          |
+------------+---------------+------+-----+---------+----------------+
| id         | mediumint(9)  | NO   | PRI |         | auto_increment |
| name       | char(255)     | YES  |     |         |                |
| accro      | char(20)      | YES  |     |         |                |
| accro_orig | char(20)      | YES  |     |         |                |
| institute  | mediumint(9)  | NO   |     |         |                |
| url        | varchar(1024) | YES  |     |         |                |
| doc        | text          | YES  |     |         |                |
+------------+---------------+------+-----+---------+----------------+
```

B.8 modelversions

```
+--------------+---------------+------+-----+---------+----------------+
| Field        | Type          | Null | Key | Default | Extra          |
+--------------+---------------+------+-----+---------+----------------+
| id           | mediumint(9)  | NO   | PRI |         | auto_increment |
| version      | char(20)      | YES  |     |         |                |
| version_orig | char(20)      | YES  |     |         |                |
| model        | mediumint(9)  | NO   |     |         |                |
| url          | varchar(1024) | YES  |     |         |                |
| doc          | text          | YES  |     |         |                |
+--------------+---------------+------+-----+---------+----------------+
```

B.9 sim_perm

```
+-------+--------------+------+-----+---------+-------+
| Field | Type         | Null | Key | Default | Extra |
+-------+--------------+------+-----+---------+-------+
| sid   | mediumint(9) | YES  |     |         |       |
| type  | tinyint(1)   | YES  |     | 0       |       |
| id    | mediumint(9) | NO   |     |         |       |
| r     | tinyint(1)   | YES  |     | 1       |       |
| w     | tinyint(1)   | YES  |     | 0       |       |
+-------+--------------+------+-----+---------+-------+
```

B.10 sim_var

```
+-------+--------------+------+-----+---------+-------+
| Field | Type         | Null | Key | Default | Extra |
+-------+--------------+------+-----+---------+-------+
| sid   | mediumint(9) | YES  |     |         |       |
| varid | mediumint(9) | YES  |     |         |       |
+-------+--------------+------+-----+---------+-------+
```

B.11 simulations

```
+------------+---------------+------+-----+---------------------+----------------+
| Field      | Type          | Null | Key | Default             | Extra
+------------+---------------+------+-----+---------------------+-----------
| id         | mediumint(9)  | NO   | PRI |                     | auto_incre
| vid        | mediumint(9)  | NO   |     |                     |
| accro      | char(20)      | NO   |     |                     |
| accro_orig | char(20)      | YES  |     |                     |
| name       | varchar(1024) | YES  |     |                     |
| subtype    | mediumint(9)  | YES  |     |                     |
| doc        | text          | YES  |     |                     |
| author     | mediumint(9)  | NO   |     |                     |
| submitter  | mediumint(9)  | NO   |     |                     |
| submitted  | timestamp     | YES  |     | CURRENT_TIMESTAMP   |
| indb       | timestamp     | YES  |     | 0000-00-00 00:00:00 |
| complete   | tinyint(4)    | YES  |     | 0                   |
+------------+---------------+------+-----+---------------------+-----------
```

B.12 subtypes

```
+-------+--------------+------+-----+---------+----------------+
| Field | Type         | Null | Key | Default | Extra          |
+-------+--------------+------+-----+---------+----------------+
| id    | mediumint(9) | NO   | PRI |         | auto_increment |
| type  | mediumint(9) | NO   |     |         |                |
| name  | char(50)     | YES  | UNI |         |                |
| doc   | text         | YES  |     |         |                |
+-------+--------------+------+-----+---------+----------------+
```

B.13 types

```
+-------+--------------+------+-----+---------+----------------+
| Field | Type         | Null | Key | Default | Extra          |
+-------+--------------+------+-----+---------+----------------+
| id    | mediumint(9) | NO   | PRI |         | auto_increment |
| name  | char(50)     | YES  | UNI |         |                |
| doc   | text         | YES  |     |         |                |
+-------+--------------+------+-----+---------+----------------+
```

B.14 users

```
+-----------+--------------+------+-----+---------+----------------+
| Field     | Type         | Null | Key | Default | Extra          |
+-----------+--------------+------+-----+---------+----------------+
| id        | mediumint(9) | NO   | PRI |         | auto_increment |
| login     | char(20)     | NO   | UNI |         |                |
| first     | char(50)     | NO   |     |         |                |
| last      | char(50)     | YES  |     |         |                |
| middle    | char(1)      | NO   |     |         |                |
| email     | char(80)     | NO   |     |         |                |
| institute | mediumint(9) | NO   |     |         |                |
| password  | char(32)     | NO   |     |         |                |
+-----------+--------------+------+-----+---------+----------------+
```

B.15 variables

```
+------------+--------------+------+-----+---------+----------------+
| Field      | Type         | Null | Key | Default | Extra          |
+------------+--------------+------+-----+---------+----------------+
| id         | mediumint(9) | NO   | PRI |         | auto_increment |
| name       | char(50)     | YES  |     |         |                |
| long_name  | char(200)    | YES  |     |         |                |
| units      | char(30)     | YES  |     |         |                |
| rank       | int(11)      | YES  |     |         |                |
| dimensions | char(50)     | YES  |     |         |                |
+------------+--------------+------+-----+---------+----------------+
```

Merci!